

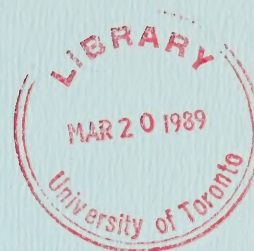
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EA-87-02

Government
Publication



ENVIRONMENTAL ASSESSMENT BOARD

VOLUME: 80

DATE: Monday, March 6th, 1989

BEFORE:
M.I. JEFFERY, Q.C., Chairman
E. MARTEL, Member
A. KOVEN, Member

FOR HEARING UPDATES CALL (TOLL-FREE): 1-800-387-8810

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HEARING ON THE PROPOSAL BY THE MINISTRY OF NATURAL
RESOURCES FOR A CLASS ENVIRONMENTAL ASSESSMENT FOR
TIMBER MANAGEMENT ON CROWN LANDS IN ONTARIO

IN THE MATTER of the Environmental
Assessment Act, R.S.O. 1980, c.140;

- and -

IN THE MATTER of the Class Environmental
Assessment for Timber Management on Crown
Lands in Ontario;

- and -

IN THE MATTER of an Order-in-Council
(O.C. 2449/37) authorizing the
Environmental Assessment Board to
administer a funding program, in
connection with the environmental
assessment hearing with respect to the
Timber Management Class
Environmental Assessment, and to
distribute funds to qualified
participants.

Hearing held at the Ramada Prince Arthur
Hotel, 17 North Cumberland St., Thunder
Bay, Ontario, on Monday, March 6th,
1989, commencing at 1:00 p.m.

VOLUME 80

BEFORE:

MR. MICHAEL I. JEFFERY, Q.C.	Chairman
MR. ELIE MARTEL	Member
MRS. ANNE KOVEN	Member

A P P E A R A N C E S

MR. V. FREIDIN, Q.C.)	MINISTRY OF NATURAL
MS. C. BLASTORAH)	RESOURCES
MS. K. MURPHY)	
MS. Y. HERSCHER)	
MR. B. CAMPBELL)	MINISTRY OF ENVIRONMENT
MS. J. SEABORN)	
MR. R. TUER, Q.C.)	ONTARIO FOREST INDUSTRY
MR. R. COSMAN)	ASSOCIATION and ONTARIO
MS. E. CRONK)	LUMBER MANUFACTURERS'
MR. P.R. CASSIDY)	ASSOCIATION
MR. J. WILLIAMS, Q.C.	ONTARIO FEDERATION OF
MR. B.R. ARMSTRONG	ANGLERS & HUNTERS
MR. G.L. FIRMAN	
MR. D. HUNTER	NISHNAWBE-ASKI NATION and WINDIGO TRIBAL COUNCIL
MR. J.F. CASTRILLI)	
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MR. R. LINDGREN)	
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MR. B. McKERCHER)	OUTFITTERS ASSOCIATION
MR. L. GREENSPOON)	NORTHWATCH
MS. B. LLOYD)	

APPEARANCES: (Cont'd)

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MR. P.D. McCUTCHEON	GEORGE NIXON

(iii)

APPEARANCES: (Cont'd)

MR. C. BRUNETTA

NORTHWESTERN ONTARIO
TOURISM ASSOCIATION

(iv)

I N D E X O F P R O C E E D I N G S

Page No.

Decision re: Calling of Dean Baskerville. 13345

Witness:

DAVID LOWELL EULER,
PETER PHILLIP HYNARD,
JOHN TRUMAN ALLIN,
RICHARD BRUCE GREENDWOOD,
CAMERON D. CLARK,
GORDON C. OLDFORD, Resumed 13350

Continued Direct Examination by Mr. Freidin 13350

(v)

I N D E X O F E X H I B I T S

<u>Exhibit No.</u>	<u>Description</u>	<u>Page No.</u>
449	Overhead entitled: Harvest, Potential Effects on the Aquatic Environment, Messages.	13355
450	Overhead listing topics of Dr. Allin's presentation.	13360
451	Overhead entitled: Studies Outside Ontario.	13363
452	Overhead depicting potential effects on water yield.	13369
453	Overhead entitled: Organic Debris.	13388
454	Overhead entitled: Inputs of Phosphorus to Surface Water.	13405
455	Overhead entitled: Inputs of Nitrates to Surface Water.	13415
456	Interrogatory No. 19 of MOE.	13422
457	Overhead entitled: Water Temperature.	13427
458	Overhead entitled: Development of Fish Habitat Guidelines, Sources of Information.	13432
459	Review of Fish Habitat Guidelines Review.	13436
460	Overhead entitled: Fish Habitat Guidelines, Size of Areas of Concern.	13445

1 ---Upon commencing at 1:10 p.m.

2 THE CHAIRMAN: Good afternoon. Please be
3 seated.

4 Ladies and gentlemen, just before we
5 proceed with the evidence this afternoon, the Board
6 would like to indicate the result of its deliberations
7 over the discussion last week concerning Dean
8 Baskerville.

9 The Board has decided that it will in
10 fact call Dean Baskerville as its witness and the Board
11 will be retaining counsel for the Board for that
12 purpose. The Board has further decided that Dean
13 Baskerville's evidence will be confined to a discussion
14 of his Audit Report which is before the Board as
15 Exhibit 16 and a discussion of that part of the
16 Ministry's action plan which is an appendix to the
17 Class EA Document which pertains to his Audit Report
18 and nothing further. And then, of course, the parties
19 will be permitted to cross-examine Dean Baskerville on
20 those areas.

21 Now, it is the Board's intention to retain
22 outside counsel for the Board shortly, within the next
23 two or three weeks, and it will be the Board's counsel
24 that makes contact with Dean Baskerville to settle the
25 terms of his appearance. And we will instruct Board

1 counsel to confer with the parties and counsel for the
2 parties as to the precise scope of the evidence to be
3 given by Dean Baskerville to the Board, but the scope
4 will be essentially the two areas that I have
5 mentioned. And we will also have counsel for the Board
6 confer with counsel for the other parties as to the
7 timing of Dean Baskerville's appearance.

8 It is likely that that timing would be at
9 the end of the Ministry's case as opposed to the end of
10 the case for those in opposition. But, once again, we
11 will allow the Board's counsel to confer with the other
12 parties prior to advising the Board as to the results
13 of those discussions and then the Board will decide as
14 to the timing of the exact appearance. And to some
15 extent, of course, it may involve questions as to when
16 Dean Baskerville can attend. He is a busy individual
17 and it may not be possible to fit him in exactly where
18 the parties or the Board would like, we may have to
19 make some accommodations in that regard to some extent.

20 And I think it goes without saying, and I
21 think the Board made it clear last week, that the Board
22 will, under no circumstances, be having any direct
23 contact with Dean Baskerville itself, any contact will
24 be made through Board counsel. And, once again, the
25 Board will be treating Dean Baskerville as any other

1 witness, he is in no special position just because the
2 Board has chosen to call him. The reason the Board has
3 chosen to call him is because of the nature of his
4 evidence and it perhaps makes more sense for the Board
5 to call him than any one particular party.

6 Very well. That's the message that I
7 wanted to convey at the outset of the proceedings
8 today.

9 MR. FREIDIN: Just one point of
10 clarification, Mr. Chairman. Do I understand that
11 counsel will in fact have the discretion to either
12 limit or to widen the scope of the evidence that Dean
13 Baskerville is going to deal with?

14 THE CHAIRMAN: No, no, I don't think
15 counsel will necessarily have that discretion, but what
16 we are saying is there may be some degree of ambiguity
17 as to what parts of the action plan that the Ministry
18 put together in response to Dean Baskerville's Audit
19 Report should be addressed by Dean Baskerville, and it
20 is in that area that the Board's counsel will confer
21 with the other parties.

22 What we are saying is, is that the Board
23 has decided, after listening to argument and
24 submissions last week, that we will not have Dean
25 Baskerville deal with the present timber management

1 plan or planning process before the Board and we will
2 not have him comment on the evidence with respect to
3 Panel 15 and Panel 16 as the Board suggested might
4 otherwise be the case.

5 Does that clarify?

6 MR. FREIDIN: It does and I assume that
7 we can always, after some consideration, make further
8 submissions to the Board.

9 THE CHAIRMAN: That's right. I suggest
10 it would be premature at this stage, I think the
11 parties should wait until Board has retained counsel.
12 The Board will be instructing counsel, essentially what
13 we have indicated to you today, to discuss those issues
14 with the parties. If you have further concerns, put it
15 through the Board counsel and then it can be discussed,
16 I suppose, in open forum at a later date.

17 Now, Mr. Freidin, can you give us some
18 indication at the outset how long in direct you might
19 be this week with the remaining three witnesses with
20 the exception of Dr. Euler who won't come until after
21 the break?

22 MR. FREIDIN: I'm hopeful to finish by
23 Wednesday, Wednesday evening.

24 THE CHAIRMAN: Very well. And we will
25 try and sit full days so we can accomplish that and

1 finish off Wednesday evening if we can.

2 MR. FREIDIN: And I really don't
3 anticipate any problem finishing by the end of
4 Wednesday.

5 THE CHAIRMAN: Very well.

6 Mr. Tuer?

7 MR. TUER: The Board would not be sitting
8 Thursday and Friday then?

9 THE CHAIRMAN: That will be correct.

10 Once we finish with these witnesses, Mr. Tuer, the only
11 witness left on this panel would be Dr. Euler who won't
12 commence his direct until the 28th of March.

13 Mr. Freidin?

14 MR. FREIDIN: Mr. Chairman, the first
15 thing I would like to do is provide to the Board a
16 package of documents which are really copies of the
17 overheads that Dr. Allin is going to in fact refer to.

18 I have made copies available to the other
19 parties and what I propose to do is to give each of you
20 a copy which is clipped together and, Mrs. Koven, I
21 have given you one which is not clipped together. I
22 would prefer to mark these as exhibits as we go along
23 as opposed to a lump sum.

24 THE CHAIRMAN: Very well.

25 MR. FREIDIN: The order might be a little

1 off, but I think we can all follow along.

2 DAVID LOWELL EULER,
3 PETER PHILLIP HYNARD,
4 JOHN TRUMAN ALLIN,
5 RICHARD BRUCE GREENWOOD,
6 CAMERON D. CLARK,
7 GORDON C. OLDFORD, Resumed

8 DIRECT EXAMINATION BY MR. FREIDIN:

9 Q. Dr. Allin, could you perhaps begin by
10 outlining the major messages that you would like to
11 convey during your evidence?

12 DR. ALLIN: A. Yes. There are a number
13 of main messages that I would like to indicate to the
14 Board which I think reflect the basic conclusions of
15 the evidence that I will present and I have that on an
16 overhead.

17 If I can have the lights, please.

18 THE CHAIRMAN: I don't know if we are
19 going to have a conflict with this light over here.
20 Oh, there it goes.

21 MR. FREIDIN: Well, I can certainly see
22 it okay from here.

23 DR. ALLIN: The first main message that I
24 would like to convey is that in fact there is a great
25 deal of information about the potential effects of
timber harvest on the aquatic environment. That
information exists in a variety of forms including a

1 large volume of scientific papers, government reports
2 of one kind or another, and a number of other types of
3 documents. So that in total all of that information
4 gives us a great deal of help in terms of identifying
5 and assessing potential effects.

6 The second message is that out of all of
7 that information many potential effects have been
8 identified and those potential effects range all the
9 way from effects on water quantity, things like
10 streamflow, right through to effects on water quality
11 and effects on aquatic life. Essentially there is
12 information on everything from bacteria and fungi right
13 through to fish.

14 Now, the nature of those potential
15 effects varies, they may be positive or negative, and
16 that really depends on a number of factors but
17 primarily the magnitude, duration and frequency of the
18 effect. And perhaps I can best illustrate that by a
19 brief example. I will be going into a little more
20 detail later in the evidence, but a brief example of
21 that would be the increased inputs of organic debris
22 into surface water that may result from harvesting
23 activities.

24 In some situations a small increase in
25 inputs of organic debris may be beneficial, it may be a

1 positive effect; on the other hand, a large increase in
2 inputs of organic debris would be negative and, as I
3 say, I will have more to say about that later.

4 The fourth message is that many potential
5 effects are similar in kind to those of natural
6 disturbance, and what I mean by similar in kind is
7 simply that the direction of the effect is the same.
8 And, again, to use an example, both timber harvest and
9 natural -- and some kinds of natural disturbance
10 generally increase water yield, as you have heard
11 through Mr. Armson's evidence in Panel 9.

12 So the direction of effect is the same
13 and, in effect, the direction of effect will be the
14 same regardless of whether the disturbance is
15 man-caused or natural; anything that removes forest
16 cover will tend to have that effect of increasing
17 streamflow.

18 The fifth message is that the
19 significance of effects in Ontario is uncertain, and
20 what I mean by uncertain in this context is that there
21 is scientific uncertainty about how significant many of
22 these effects are in an Ontario context.

23 As Dr. McNamee indicated in Panel 8, we
24 do know a lot about the various effects in a
25 qualitative sense and we do know in most cases the

1 basic cause/effect relationships that are involved.
2 Where the uncertainty comes in is in the quantitative
3 or -- the quantitative sense or the magnitude of the
4 effect. In some cases the magnitude and duration of
5 effects, at least in the Ontario situation, are
6 uncertain and that is because we simply have not
7 quantified those effects in Ontario.

8 Now, although there is uncertainty about
9 the significance of effects, we nevertheless have
10 developed a number of ways of dealing with those
11 effects and protecting the aquatic environment and, as
12 indicated in message six, the major tool to do that is
13 the Fish Habitat Guidelines.

14 But in saying that I don't want to give
15 the impression that those guidelines are the only tool
16 that we have to prevent or minimize effects because
17 certainly there are other ways in which that is done as
18 well, and an example of that would be the new Code of
19 Practice for Timber Management Operations in Riparian
20 Areas. The use of that code will also help to protect
21 the aquatic environment.

22 In addition to that, the use of a number
23 of other Ministry guidelines, provincial guidelines,
24 such as the Tourism or Moose Habitat Guidelines, will
25 also, in many cases, benefit water quality and aquatic

1 life. And an obvious example of that would be through
2 the use of the moose guidelines in protecting aquatic
3 feeding areas that is done essentially by maintaining a
4 reserve near certain portions of the shoreline or
5 stream and that will have the effect also of
6 benefitting water quality and aquatic organisms.

7 Again, an example from the tourism
8 guidelines would be that, in many cases, shoreline
9 reserves are maintained for aesthetic reasons and that
10 also will have a beneficial effect on water quality.
11 And then, in addition to the use of these various
12 guidelines, in some cases, particular values will be
13 protected on a site-specific basis.

14 We obviously don't have guidelines that
15 cover every conceivable situation and there will be
16 times in which specific values are protected by making
17 a site-specific decision based on local information.

18 The final message is that the guidelines
19 are believed to be effective in preventing or reducing
20 adverse impacts, and although I can't say with
21 scientific certainty that the guidelines are effective,
22 I was heavily involved in developing those guidelines,
23 I know the kinds of certain concerns we dealt with, the
24 kinds of information that were used as a basis for the
25 guidelines and, in my opinion, the guidelines are in

1 fact effective.

2 I guess the basis for my opinion is
3 really two things: The fact that the guidelines were
4 based on the best scientific information that we had
5 available; and, secondly, that both the nature of the
6 guidelines and the way in which they are used make the
7 approach to protection of aquatic values a conservative
8 one.

9 And I guess the only final point I would
10 make is that the actual effectiveness of the guidelines
11 will be confirmed through scientific studies and there
12 I am referring to the effects monitoring program that
13 was referred to in Panel 8 and will be discussed in
14 detail in Panel 16.

15 MR. FREIDIN: Q. Dr. Allin, some of the
16 papers cited in the -- sorry.

17 MR. FREIDIN: Mr. Chairman, perhaps we
18 can mark that overhead as the next exhibit.

19 THE CHAIRMAN: Very well. That will be
20 Exhibit No. 449.

21 MR. FREIDIN: The heading of that exhibit
22 will be Harvest, Potential Effects on the Aquatic
23 Environment, Messages.

24 ---EXHIBIT NO. 449: Overhead entitled: Harvest,
25 Potential Effects on the Aquatic
Environment, Messages.

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MR. FREIDIN: Q. Dr. Allin, some of the papers that are cited in the report by yourself and Mr. Ward deal with how certain land use activities and, in particular, timber management have the potential to cause detrimental effects on water quality.

Could you advise in what way you feel qualified to speak to those matters?

DR. ALLIN: A. Yes. As the supplement to my curriculum vitae indicates, throughout my working career I have been dealing with the effects of various land use practices on water quality both in terms of water quality but beyond that, effects on aquatic life and particularly fish habitat.

And in relation to that, my first permanent position was with the Illinois Pollution Control Board and during my time with that board we conducted a fairly major study of the effects of certain agricultural practices on water quality, particularly the use of fertilizers because at that time the use of fertilizer on land used for corn was of particular concern in relation to quantities of nitrates that were getting into surface water.

I guess subsequent to my involvement with the Illinois Pollution Control Board, when I joined the

1 Ministry much of my time was devoted to dealing with
2 the effects of various land use practices on aquatic
3 habitat and aquatic life and not just the effects of
4 timber management, that also involved various other
5 practices such as highway construction, the large Hydro
6 electric generating stations and thermal generating
7 stations that have been developed in the province.

8 But probably the experience that I have
9 had that's most directly relevant to this environmental
10 assessment is my experience in developing the Fish
11 Habitat Guidelines because that required me to
12 undertake a very extensive review of the literature on
13 potential aquatic effects of timber management, and
14 also that involved discussions with a large number of
15 people with expertise in a variety of related areas.

16 Q. And I understand, Dr. Allin, that you
17 were the main author of the Fish Habitat Guidelines?

18 A. Yes, that's correct.

19 Q. Now, the first message that you
20 identified was that there was considerable knowledge
21 about the potential effects of timber management, in
22 particular, harvest on the aquatic environment.

23 Although you have dealt with that or
24 described it briefly in your opening remarks, could you
25 advise us of what the source of that knowledge is?

1 A. Yes. We have undertook what I
2 consider to be a very comprehensive search for
3 information on potential aquatic effects relating to
4 timber harvest, as well as other activities, and in the
5 course of that we have acquired a good deal of
6 information and the original purpose of doing that was
7 to develop the Fish Habitat Guidelines. That was
8 several years ago when that effort was begun.

9 But subsequent to that, of course, we
10 extended the search for information in order to develop
11 the information that went into the Class Environmental
12 Assessment Document and the evidence that we are
13 presenting here.

14 You asked about sources of that
15 information. We used a variety of sources. The
16 scientific literature of course - and some of that is
17 within -- comes from studies within Ontario, some of it
18 comes from studies outside Ontario - we also obtained
19 information through the ESSA workshops which I believe
20 the Board is familiar with through discussions in Panel
21 8, and that simply involved a number of individuals who
22 reviewed the Fish Habitat Guidelines and examined a
23 variety of potential effects of timber management on
24 the aquatic environment and those people had a variety
25 of expertise in areas that were relevant to that

1 exercise.

2 We also consulted with a number of
3 experts from both within and outside the Ministry, and
4 I do intend to deal with that a little more
5 specifically in later evidence. And the final source
6 of information was basically through local observation
7 and experience, both of myself and others and, again, I
8 would like to discuss that matter a little more fully
9 later.

10 Q. Could you advise: What are the
11 potential effects that you will addressing in your
12 evidence?

13 A. Well, I will try not to repeat
14 evidence particularly of Mr. Armson because much of
15 what he had to say about hydrologic and nutrient cycles
16 of course does have some bearing on the aquatic effects
17 that I am going to talk about, but I have an overhead
18 which indicates the topics that I will be addressing.

19 I will let you read those topics for
20 yourself, but basically they are the same as the topics
21 that are indicated in the witness statement. I will be
22 addressing each one of them, but I am going to attempt
23 to confine myself to points of clarification with
24 respect to each one rather than going into each one in
25 detail.

1 MR. FREIDIN: I don't believe that needs
2 to be marked as an exhibit, Mr. Chairman.

3 THE CHAIRMAN: You don't want it as an
4 exhibit?

5 MR. FREIDIN: Well...

6 THE CHAIRMAN: We might as well put it in
7 because I haven't taken notes about it, I have just
8 referred to the exhibit number.

9 MR. FREIDIN: Sure, okay.

10 THE CHAIRMAN: Exhibit 450.

11 MR. FREIDIN: I just don't want to close
12 in on the thousand too quickly.

13 THE CHAIRMAN: Well, you wanted separate
14 ones for this pile instead of one, so it is your
15 problem, not ours.

16 ---EXHIBIT NO. 450: Overhead listing topics of Dr.
17 Allin's presentation.

18 MR. FREIDIN: Q. Are the cause/effect
19 relationships of timber management activities and the
20 aquatic environment well understood, Dr. Allin?

21 DR. ALLIN: A. They are understood to
22 some degree, in some cases better than others. In most
23 cases I would say that we know the direction of the
24 effect and the basic cause/effect relationships that
25 are involved. And perhaps an example would help to

1 deal with that.

2 An example I would like to use is the
3 effects of timber harvesting along streams on water
4 temperatures. There the cause/effect relationship is
5 fairly obvious. You harvest the trees beside the
6 stream, you remove at least part of the shade, if not
7 all of it from the stream, so at least in summer the
8 water temperature is increased. So that is an example
9 of a case where the basic cause/effect relationship is
10 well understood.

11 However, that is not true of all effects.
12 In some cases, those cause/effect relationships are
13 complex, they are not very well understood and perhaps
14 the prime example of that relates to potential
15 acidification of water resulting from harvest
16 operations.

17 In that particular case, not only are the
18 cause/effect relationships not very well understood,
19 but in that case even the nature of the effect is not
20 at all clear simply because the experimental results of
21 studies relating to an effect are so variable. I will
22 have more to say about that a little later.

23 Q. Okay. Are there any jurisdictions
24 which have comprehensive studies on all the potential
25 effects of timber management activities on the aquatic

1 environment, and I am talking about the potential
2 effects that you speak about in your paper?

3 A. Not to my knowledge.

4 Q. Does that surprise you at all, Dr.
5 Allin?

6 A. No, it doesn't. Every jurisdiction
7 has to make decisions about where it is going to put
8 its research efforts and normally those efforts go into
9 where that jurisdiction decides the information is most
10 needed.

11 Certainly there are some jurisdictions
12 which have done very detailed studies in local areas of
13 the effects of timber management, but I don't know of
14 any situation where those studies would have covered
15 all the potential effects or where that jurisdiction
16 could use those results for all site conditions that it
17 might encounter.

18 Q. Can you advise: Are any
19 Ontario-based studies dealing with the potential
20 effects of timber management being planned?

21 A. Yes. The studies that have been
22 described as -- that will be done in the effects
23 monitoring program will address those effects.

24 Q. Now, you refer to there being studies
25 from other jurisdictions. Your report relies on

1 studies from outside Ontario to identify some of the
2 potential effects of timber management on the aquatic
3 environment in Ontario. Do you feel that studies from
4 other jurisdictions are relevant when identifying
5 potential effects in Ontario?

6 A. Yes. I have on overhead, again, that
7 deals with that.

8 MR. FREIDIN: Can we mark that as Exhibit
9 451, Mr. Chairman.

10 THE CHAIRMAN: Very well. Exhibit 451.

11 ---EXHIBIT NO. 451: Overhead entitled: Studies
12 Outside Ontario.

13 DR. ALLIN: Now, in looking at that
14 particular question as to how relevant studies are that
15 are carried on outside Ontario, the relevance of those
16 kinds of studies varies a great deal.

17 It depends -- as indicated in Point 1
18 there, it depends on similarities and differences with
19 respect to a large number of factors, some of which I
20 have listed there. Similarities or differences in
21 climate, topography, soils, the nature of the aquatic
22 eco-systems involved, and the nature of the timber
23 management practices that are carried out within the
24 area of study.

25 Because of differences with respect to

1 those factors, Point No. 2 comes into play, the fact
2 that caution is necessary in using the results.
3 However, I think Point No. 3 is very important here and
4 that's the point that the same principles; that is, the
5 same cause/effect relationships usually apply wherever
6 the study is carried out.

7 And an example of that would be that if
8 other things are equal, the potential for erosion
9 increases with the steepness of slope and that's true
10 regardless of where the study is carried out.

11 I think the major value in looking at
12 studies that are carried out elsewhere is, first of
13 all, that those studies help to identify the range of
14 potential effects. So they help us to identify
15 potential effects and beyond that, they also help to
16 identify possible protection measures, things that can
17 be done in order to reduce the impact of at least the
18 potentially negative effects.

19 Q. Now, Dr. Allin, later in your
20 evidence you are going to be describing the role that
21 the Fish Habitat Guidelines and the Code of Practice in
22 Riparian Areas play in timber management; is that
23 correct?

24 A. That is correct.

25 Q. And could you at this point just

1 briefly describe what their role or purpose is?

2 A. Well, the purpose of both the
3 guidelines and the code is to prevent or minimize
4 adverse effects on the aquatic environment.

5 Q. And without the use of those tools;
6 that is, the guidelines and the Code of Practice, are
7 you able to say whether the potential effects of
8 harvest on the aquatic environment would be positive or
9 negative?

10 A. That is not a simple question, so
11 there is not a simple answer, and one really can't
12 generalize very much about that. And I guess that the
13 major reason for that is that for every effect that I
14 am going to be describing here, with the exception of
15 sedimentation, which is never a positive effect, all of
16 the other potential effects in some situations can be
17 positive as well as negative.

18 Q. Can you generalize as to why an
19 effect has the potential to be both positive and
20 negative?

21 A. Well, in cases where the magnitude of
22 the effect is small, there is a potential for the
23 effect to be positive in nature, but when the magnitude
24 of the effect is great, then the effects are likely to
25 be negative.

1 Q. Have you been able to determine under
2 what specific circumstances each of the various effects
3 that you are going to refer to move from being positive
4 to being negative?

5 A. We have not been able to do that in
6 any precise way, and I would like to illustrate that by
7 way of an example.

8 If we consider a stream in which one of
9 the major fish species is brook trout. Now, brook
10 trout is a cold water species, it has a very
11 narrow temperature tolerance, it basically likes cool
12 temperatures. So that we do know the temperature
13 requirements of brook trout, we know the temperatures
14 at which it does best and we know the maximum
15 temperatures that it can tolerate.

16 We also know that by harvesting timber
17 along streams we reduce shading and are likely to
18 increase those water temperatures. What we don't know,
19 is how much timber -- how many trees can be harvested
20 along the stream before the water temperatures will
21 rise too high for brook trout. And that effect is
22 likely to be different -- somewhat different for each
23 stream because the magnitude of the effect will depend
24 on a great number of things.

25 It will depend on the flow in the stream,

1 it will depend on the width of the stream, the aspect,
2 the amount of groundwater input, a whole host of
3 factors and they will vary with different streams.

4 Q. Have you been able to quantify or
5 define a range within which this change from positive
6 to negative effect would occur?

7 A. No, we have not.

8 Q. In light of that uncertainty, what do
9 you do as a fisheries biologist who is concerned about
10 protection of the aquatic environment?

11 A. Well, it basically means that we need
12 to adopt an approach that is conservative.

13 Q. And what do you mean by conservative
14 in this context?

15 A. Well, I mean that we try to minimize
16 the degree of change resulting from a practice, even
17 though some small amount of change may actually be
18 beneficial or positive.

19 Q. Could you expand on that a little
20 bit?

21 A. Well, basically it is a question
22 of -- or matter of trying to error on the side of
23 safety, in that we are trying to provide a level of
24 protection that may not always be necessary in every
25 situation, but that should ensure that values are

1 protected in virtually all situations.

2 Q. I understand that for some of the
3 potential effects that you have identified that you
4 will be addressing as a potential for a positive as
5 well as negative effect?

6 A. That's right.

7 MR. FREIDIN: And, Mr. Chairman, I had a
8 bit of a chicken and egg problem when we were laying
9 out this examination-in-chief as to whether we
10 introduced the guidelines and the Code of Riparian
11 Practice at the beginning and then about potential
12 effects or do it the other way around and we decided to
13 do it the other way around, and have Dr. Allin deal
14 with the potential effects of the various activities
15 and after that we will describe the Fish Habitat
16 Guidelines and the Code of Riparian Practice and how
17 they should address - do address those potential
18 effects.

19 Q. So the first I believe potential
20 effect that you wanted to deal with, Dr. Allin, was the
21 effect of harvest on water yield. And again you
22 indicated that the effect on water yield would be both
23 positive and negative in terms of the effect on the
24 aquatic environment. Would you please explain how that
25 could occur?

1 DR. ALLIN: A. Yes. And, again, I have
2 an overhead that addresses that.

3 MR. FREIDIN: You have got to skip three
4 of the pages. And that would be Exhibit No. 452, Mr.
5 Chairman.

6 THE CHAIRMAN: Exhibit 453 I have.

7 MR. FREIDIN: 53.

8 MR. FREIDIN: What was 52?

9 THE CHAIRMAN: Oh, I am sorry, you are
10 right, it is 52.

11 ---EXHIBIT NO. 452: Overhead depicting potential
12 effects on water yield.

13 DR. ALLIN: The first point here is that
14 harvesting of timber generally increases streamflows -
15 and, again, that was discussed in Panel 9 by Mr.
16 Armson - and those increases in streamflow tend to
17 occur following both storm events and also during
18 periods of low flow. And that is, of course, normally
19 in late summer and we need to deal with those two
20 effects separately--

21 MR. MARTEL: Can I ask a question before
22 you...

23 DR. ALLIN: --storm events or peak flows
24 and low flows.

25 MR. MARTEL: Low flows in late summer.

1 Is the water not down at that period of time?

2 DR. ALLIN: Yes.

3 MR. MARTEL: I mean, the line. I'm just
4 having having difficulty understanding the concept.

5 DR. ALLIN: That was basically the point
6 that I was making. That is normally the time, late
7 summer, in which the natural streamflow is lowest. And
8 the point here is that timber harvesting increases
9 streamflow and it tends to do that in fact in late
10 summer when the streamflows are naturally lowest.

11 MR. MARTEL: But based on what? I mean,
12 how do you increase the flow if the waters are lowest
13 at that stage?

14 DR. ALLIN: Well, because of removing the
15 forest cover. The trees are normally taking up water
16 and transpiring it. When you remove those trees, the
17 water is left in the soil, it gets into groundwater and
18 then increases streamflow.

19 MR. MARTEL: Okay fine, thank you.

20 DR. ALLIN: If we deal first of all with
21 the effects of higher peak flows, that is following
22 storm events, the effects of increased yields at that
23 time are potentially negative and that is because the
24 higher streamflows during those events tend to cause
25 increased erosion of stream channels both of the bottom

1 and of the banks.

2 In doing that, they increase water
3 trepidity, so there is an impairment of water quality.

4 MR. FREIDIN: Q. What do you mean by
5 water trepidity?

6 DR. ALLIN: A. What trepidity relates to
7 the amount of suspended or dissolved materials in water
8 that reduce its clarity.

9 And the third point that I have mentioned
10 there in terms of effects is that the increased water
11 flow during those times of storm events may cause a
12 washout of invertebrates or fish eggs or anything that
13 is buried in the stream bottom and that leads normally
14 to destruction of those forms of life.

15 On the other hand, when we deal with the
16 effects of higher low flows during late summer, that
17 can be potentially positive because it provides more
18 water and, therefore, more living space for aquatic
19 life at a time when living space is normally most
20 limiting.

21 The final point there, the significance
22 of these effects relating to water yield in Ontario is
23 uncertain and that is because the occurrence and
24 magnitude of changes in hydrology, the actual changes
25 in water yield have been documented in only a few

1 studies in Ontario. And then if you look at the
2 biological effects of those changes in the amount of
3 water, to my knowledge, those effects have not been
4 studied anywhere, at least in relation to timber
5 harvest.

6 So, in essence then, these effects that
7 relate to water yield have been identified as potential
8 effects but whether they are significant in the Ontario
9 context is really uncertain.

10 Q. And when you use uncertain, are you
11 referring to scientific uncertainty as you have
12 described earlier?

13 A. Yes, I am.

14 Q. And can you advise: Will the
15 potential effects of increased water yield that you
16 have described be addressed in the future in any way?

17 A. Yes, they will be addressed in the
18 effects monitoring program that I spoke of earlier.

19 Q. I would like to move on to the next
20 potential effect, Dr. Allin, and that is the potential
21 effect of erosion and sedimentation.

22 A. Yes.

23 Q. Now, if you could turn to page 846 of
24 the witness statement, I think it is 416B, you tell me
25 when you get to that page, Dr. Allin?

1 A. Yes, I have it.

2 MR. FREIDIN: 846.

3 Q. And I would like to refer you to the
4 second full paragraph. It states:

5 "Harvesting is reported to disturb a
6 maximum of 30 per cent of the soil
7 surface depending on the methods and
8 equipment used."

9 And you site the study by Rice in 1972:

10 "The occurrence of surface erosion thus
11 tends to be localized."

12 When you made the statement that harvesting is reported
13 to disturb a maximum of 30 per cent of the soil surface
14 depending on methods and equipment used, do I take it
15 that you were referring to or relying upon the article
16 which is cited, the article by Rice?

17 DR. ALLIN: A. Yes, that's right.

18 Q. And could you advise where that
19 particular study occurred?

20 A. It was not a specific study, it was a
21 review article that deals with a number of studies that
22 were carried out in different areas of the west coast
23 of the U.S.

24 Q. Have there been any studies
25 suggesting that that particular statement applies to

1 Ontario?

2 A. No, there haven't.

3 Q. Within that particular study which
4 dealt with situations on the west coast, can you
5 advise: What was meant by soil disturbance and what
6 does the 30 per cent maximum figure represent?

7 A. Yes. In this context, soil
8 disturbance refers to the actual exposure of mineral
9 soil by removing the forest floor or duff, and the 30
10 per cent figure was the maximum figure that was
11 observed in those studies in terms of the extent of
12 mineral soil exposure over the entire harvested area.

13 Q. And could you advise why that
14 particular study was referenced in your paper, when it
15 dealt with situations on the west coast as opposed to
16 situations in Ontario?

17 A. Well, basically that whole matter of
18 the extent of mineral soil exposure has not been
19 documented very much anywhere and basically it was the
20 only study I found that actually quantified the extent
21 of mineral soil exposure.

22 Q. And am I correct that you didn't
23 carry out any analysis of the actual timber management
24 activities in those jurisdictions in comparison to
25 Ontario?

1 A. I didn't carry out any analysis. I
2 know the types of operations that they were dealing
3 with.

4 Q. Okay. Now, Mr. Hynard, I am just
5 wondering, in relation to the Great Lakes/St. Lawrence
6 Forest where you practised, could you advise or comment
7 on the applicability of the observation which was made
8 by Mr. Rice that harvesting is reported to disturb a
9 max number of 30 per cent of the soil surface where
10 disturbance is interpreted to mean exposure of mineral
11 soil?

12 Does that apply, or doesn't it apply in
13 the Great Lakes/St. Lawrence Forest region?

14 MR. HYNARD: A. That statement itself
15 would not apply. I would be very surprised if mineral
16 soil exposure resulting from logging operations in the
17 Great Lakes/St. Lawrence Forest exceeded anything more
18 than 1 or 2 per cent.

19 Q. And, Mr. Oldford, could you comment
20 on the applicability of the observation made by Mr.
21 Rice to the situation in the boreal forest region?

22 MR. OLDFORD: A. I would be inclined to
23 reply along the same lines as Mr. Hynard. Mineral soil
24 exposure directly from forest harvesting activities is
25 extremely low.

1 Q. Why is that the case?

2 A. It is the case because there is
3 really no action on-going which disturbs the root mat
4 and the humus layers, the layers of lower vegetation,
5 and there is really no reason to disturb them.

6 The only disturbance that you would get
7 along a roadway normally, but not in the area where the
8 harvesting is underway.

9 Q. Mr. Hynard, in relation to the Great
10 Lakes/St. Lawrence Forest, perhaps you could just
11 address why you felt that the mineral soil exposure
12 would be as low as you indicated?

13 MR. HYNARD: A. I think for three
14 reasons. One, first of all, of course, is slope on the
15 Pacific northwest is mountainess terrain and that is
16 not true of the Great Lakes/St. Lawrence Forest;
17 the second reason would be logging methods. The system
18 used in the Pacific northwest is cable yarding; and the
19 third reason would be that they use clearcutting
20 exclusively in combination with -- I think the combined
21 three factors of clearcutting, slope and logging method
22 all contribute towards a much higher degree of mineral
23 soil exposure there than I, for example, would
24 experience on my unit.

25 Q. Can you describe what you mean by

1 cable yarding?

2 A. Cable yarding is a logging method
3 that is used on very steep slopes in which a high lead
4 or a spar is installed and cables are run out in the
5 bush and logs are choked and pulled up the slope to
6 that -- Gord, can you help me there? Have you watched
7 them cable yard at all?

8 MR. OLDFORD: A. I have watched the
9 small cable yarders on the east coast, not much
10 different really, Mr. Chairman, than a clothesline, an
11 old-fashioned clothesline where at one end there would
12 be a motor and along that clothesline there would be
13 chokers or a mechanism for attaching chokers to pull
14 the trees, in some cases to the top of the hill and, in
15 other cases, to the bottom of the hill, wherever the
16 road was that you are going to remove them on.

17 MR. MARTEL: Does it touch the ground
18 perhaps one end of it as they are pulling it up?

19 MR. OLDFORD: It might, it might. There
20 would be places where the trees would probably be
21 suspended. But quite a bit of the time, part of the
22 log is dragging on the ground.

23 MR. MARTEL: And it would only affect
24 those areas then. You said just the duff primarily as
25 opposed to the...

1 MR. OLDFORD: I would have to see the
2 particular area or read that report. I find reference
3 to that degree of soil exposure to be startling to say
4 the least. I have -- I guess I spent a lot of my time
5 as a unit forester trying to create soil exposure so
6 that we could successfully see jack pine.

7 And where we did our very best efforts
8 with bulldozers with young's teeth and various
9 scarification implements, and we were attempting at the
10 time to get 25 per cent mineral soil exposure because
11 we new that applying 20,000 jack pine seed with the
12 survival rates that we had in the seed, and if we had
13 25 per cent mineral soil exposure we had a successful
14 plantation from seeding.

15 And we had terrible times, you know, it
16 was difficult with slash, with the debris on the forest
17 floor, just to get 25 per cent.

18 So I am a little bit surprised that
19 someone could get anything in that order, even in the
20 west coast inadvertently from logging. You couldn't
21 even come close to it anywhere in Ontario, that I know
22 of.

23 MR. FREIDIN: Q. Okay. Referring to the
24 same paragraph, Dr. Allin, you indicate in the last
25 sentence:

1 "The occurrence of surface erosion thus
2 tends to be localized."

3 Could you advise what is meant by localized in that
4 context?

5 DR. ALLIN: A. Yes. That refers to the
6 fact that where you do get exposure of mineral soil it
7 tends to occur in very localized patches rather than in
8 continuous or contiguous areas. In other words, the
9 patches are not typically connected to one another. So
10 that any surface erosion that does occur tends to occur
11 from those very localized areas.

12 Q. Mr. Hynard, can you advise whether
13 that particular statement would apply to your
14 observations of the situation in the Great Lakes/St.
15 Lawrence Forest?

16 MR. HYNARD: A. I am sorry, I would have
17 to have Dr. Allin repeat that.

18 DR. ALLIN: A. It was simply the fact
19 that wherever there is exposure of mineral soil it
20 tends to occur in localized patches and is not
21 continuous over large areas. So that any erosion that
22 does occur would be from the localized areas.

23 MR. HYNARD: A. Oh yes, that is
24 absolutely true. The only case that I can think of
25 would be on a skidder trail where -- on a hillside

1 where water was running down the ruts of the skidder
2 trail there would be a little soil movement until the
3 machine had curved. It would be very localized.

4 Q. Mr. Greenwood, could you comment on
5 the situation or the applicability of that statement to
6 the boreal forest?

7 MR. GREENWOOD: A. I agree with Mr.
8 Hynard's comments and, in fact, I think I have some
9 evidence tomorrow that will be speaking to this and I
10 can demonstrate it in some photographs as well.

11 Q. Thank you. Now, sticking with page
12 846, if you would proceed to the next paragraph, Dr.
13 Allin. You refer to -- let me just read it:

14 "Timber harvesting may also cause
15 increased erosion of stream banks and
16 bottom sediments as a result of increased
17 peak flows and direct disturbance of the
18 stream during harvesting operations."

19 What were you referring to when you used the phrase
20 direct disturbance in that paragraph?

21 DR. ALLIN: A. That refers to actually
22 operating machinery either in the stream itself, such
23 as by crossing a stream with a skidder, or actually
24 operating heavy machinery on the stream bank itself.

25 And I should point out that both of those

1 kinds of practices are avoided by the use of reserves
2 according to the Fish Habitat guidelines and they are
3 also specifically discouraged in the Code of Practice.

4 Q. Now, when you use the phrase
5 reserves, in the context of the Fish Habitat Guidelines
6 what does the word reserve mean?

7 A. The reserve -- the term reserve
8 refers to a no-cut area beside the stream or on the
9 lakeshore.

10 Q. All right. And I understand that
11 later in your evidence you will be dealing with
12 situations where you can have operations within an area
13 designated as an area of concern beside a water body?

14 A. That's right. Where those operations
15 do occur within an area of concern, we would not term
16 that a reserve, we restrict that term to a no-cut
17 situation.

18 Q. And what will you be referring to --
19 when you have a situation where you have an area of
20 concern next to a water body and certain timber
21 management operations are allowed within that area of
22 concern, what phrase will you use to describe those
23 operations?

24 A. In our terminology, that would be an
25 area of modified operations.

1 Q. Thank you. And in terms of the Code
2 of Practice --

3 MR. FREIDIN: One moment Mr. Chairman.
4 Exhibit 434, Mr. Chairman, is the Code of Practice for
5 Riparian Areas.

6 Q. And I am just wondering, Dr. Allin,
7 are you able to direct our attention to the provisions
8 of that Code of Practice which deal with the subject
9 matter that you just referred to; that is, equipment
10 actually entering into a water body?

11 DR. ALLIN: A. Well, the actual sections
12 of the Code that deal with operating machinery either
13 in the stream or on the stream bank are contained in
14 Section 5 of the Code which begins on page 4, and I
15 would refer you to paragraph 5(c) which states that:

16 "Equipment operating adjacent to water
17 bodies shall not cause distruction or
18 slumping of banks."

19 That relates to the concern for operating heavy
20 machinery right on the bank itself. And the other
21 relevant section is Section 5(f) on page 5 which says
22 that:

23 "An arrow filter strip of approximately
24 three metres of undisturbed forest floor
25 or vegetation, not necessarily tree

1 species, is to be left on the banks of
2 water bodies except where necessary to
3 cross a stream."

4 And the intent of that is to keep machinery away from
5 the immediate stream bank and also to trap sediment
6 that might be generated in other areas.

7 Q. Thank you. Can you turn the page to
8 page 847. If I can refer you to the second full
9 paragraph which begins with the word "landings". Do
10 you have that?

11 A. Yes, I do.

12 Q. There is reference made to:
13 "Landings being a potential source
14 of sediment to water bodies if they are
15 located nearby and to ground vegetation
16 at landings being largely removed and
17 soils being compacted more than
18 elsewhere."

19 Do the Fish Habitat Guidelines address this particular
20 concern?

21 A. Yes, the guidelines specify that
22 landings should not be located within areas of concern,
23 near any kinds of lakes or streams.

24 Q. And when you say any kind of lakes or
25 streams, I take it that refers to cold water lakes,

1 warm water lakes and cool water lakes?

2 A. That's right, the categories of lakes
3 and streams as they are defined in the guidelines
4 themselves.

5 Q. Okay. Page 848, if I could refer you
6 to the fourth full paragraph which begins:

7 "The duration of the erosional
8 effects..."

9 A. Yes.

10 Q. If I can just take a moment and read
11 that, it says:

12 "The duration of erosional effects of
13 harvesting is variable depending
14 primarily on the rate at which disturbed
15 soils become stabilized by revegetation.
16 In Ontario, substantial vegetative ground
17 cover usually develops naturally within
18 one to five years."

19 First of all, when you refer to the duration of
20 erosional effects, what is the extent of erosional
21 effects that you are referring to in that paragraph?

22 A. That refers to the localized areas in
23 which you could have some amount of mineral soil
24 exposure.

25 Q. Okay. As you described just a few

1 moments ago in your evidence?

2 A. Yes.

3 Q. And as explained by Mr. Hynard--

4 A. Right.

5 Q. --and Mr. Oldford?

6 A. Right.

7 Q. Now, did you hear the evidence of Mr.

8 Armson during Panel No. 9 that erosion in Ontario was

9 not at problem?

10 A. Yes, I did.

11 Q. Do you believe that the statement
12 which you have on page 848 is a contradiction of that
13 evidence?

14 A. No, I don't. I believe his statement
15 was made in the general context of what happens within
16 the area of the undertaking. There will be some local
17 areas where the ground vegetation is removed and where
18 it will take a longer time to revegetate, and an
19 example of that would be where landings are located.

20 Q. Okay. Now, Mr. Greenwood, could you
21 advise: Does revegetation of a site vary from site to
22 site?

23 MR. GREENWOOD: A. Yes, in fact it
24 would. I can think of examples where the site is very
25 rich and, in fact, would be revegetated immediately

1 following logging; that is, the ground vegetation which
2 is there would not be disturbed to the extent that
3 after logging it wouldn't be acting to stabilize the
4 site.

5 There are other sites where particularly
6 nutrients are low or they are very dry and there is
7 very little ground vegetation following logging and the
8 opening up of the site to light, these sites could take
9 a little longer.

10 Q. Thank you. Dr. Allin, still sticking
11 with page 848, I understand that there is a correction
12 that you would like to make in relation to the last
13 paragraph on page 848?

14 DR. ALLIN: A. Yes. And the change is
15 in the first line of that last paragraph. The first
16 sentence there should read:

17 "The duration of the effects of increased
18 sedimentation of water bodies may be
19 short or long term."

20 "The duration of the effects of increased
21 sedimentation of water bodies may be
22 short or long term."

23 And that is because the reference to trepidity and
24 sediment deposited on a stream body, in that context,
25 relates to what happens after the eroded material has

1 actually entered the stream, rather than to the
2 duration of the sedimentation itself and, by
3 sedimentation, I mean the actual entry of eroded
4 material into the stream.

5 And what's being referred to here is not
6 the duration of sedimentation, but to the duration of
7 effects after the sediment has gotten into the stream,
8 if in fact any sedimentation has occurred.

9 MR. FREIDIN: Mr. Chairman, in terms of
10 the effects of sedimentation when it does occur, that
11 is a subject matter which will be dealt with in Panel
12 No. 14 when we deal with roads. Mr. Ward will be the
13 fisheries biologist who will be dealing with that
14 particular evidence.

15 And I should advise you that originally
16 we had anticipated that Panel No. -- the subject matter
17 of roads was going to be dealt with before we dealt
18 with harvest, so that's why all the evidence about
19 sedimentation all got developed in that section on
20 roads.

21 And I think you have heard from witnesses
22 to date that it is road construction that has the
23 greatest potential for erosion and sedimentation as
24 opposed to the timber management activities. So that's
25 another reason that we are dealing with it when we deal

1 with roads.

2 Q. I would like to move on, if I might,
3 Dr. Allin, to the next potential effect of harvest and
4 that is the introduction of organic debris to the
5 aquatic environment. If I might, I would like to refer
6 you to page 850 of the witness statement. And do you
7 have that?

8 DR. ALLIN: A. Yes, I do.

9 Q. I just want to refer you to the first
10 sentence which reads:

11 "Inputs of organic debris to water bodies
12 may be either beneficial or harmful to
13 water quality and aquatic life."

14 Could you explain, please, how this debris can have a
15 positive or negative effect?

16 A. Yes. And, again, I have an overhead
17 that I would like to use.

18 MR. FREIDIN: We will mark that. That
19 will be, I think, Exhibit 453, Mr. Chairman?

20 THE CHAIRMAN: That's correct.

21 ---EXHIBIT NO. 453: Overhead entitled: Organic
22 Debris.

23 DR. ALLIN: In addressing that point I
24 would like to distinguish between what I would call
25 large debris and fine debris. And here by large debris

1 I am referring to the trunks of trees or large
2 branches; whereas when I am talking about fine debris,
3 what I mean by that is leaves, twigs and small
4 branches.

5 MR. FREIDIN: Q. And I understand that
6 the ESSA Report made a distinction along similar lines?

7 DR. ALLIN: A. Yes, that's correct.
8 They defined large debris as anything over 10
9 centimetres in diameter.

10 Q. All right. And does your use of the
11 word large debris have a similar meaning?

12 A. Yes, it does.

13 Q. Thank you.

14 A. If we deal first of all with large
15 debris, whether the effect of inputs of large debris is
16 positive or negative depends, to a large extent, on the
17 amount of input.

18 Limited inputs of large debris are
19 potentially positive in terms of the aquatic
20 environment because large debris can provide valuable
21 habitat for aquatic life providing that it is not
22 deposited in excessive amounts and provided that it is
23 stable.

24 Obviously a tree falling into a stream
25 which is carried by currents down that stream and keeps

1 hitting stream banks and so on is not going to provide
2 very useful habitat, but a single tree falling into a
3 stream, if it becomes lodged in the stream such that it
4 is stabilized, can provide very valuable habitat for
5 aquatic life. And an example of that would be that it
6 provides shelter for fish.

7 On the other hand, if there are large
8 inputs of organic -- large organic debris such as a
9 large number of trees falling into a stream, obviously
10 that can be negative in terms of its effects. In that
11 situation, the debris can obstruct waterflow so that,
12 for example, the streamflow might travel around the
13 obstruction and, therefore, erode the stream banks. It
14 can also block movements of fish and generally cause
15 erosion both of the banks and the bottom of the stream.

16 If we now go on to discuss fine debris,
17 it is really the same principle, in that limited inputs
18 are again potentially positive and that is because
19 leaves particularly can be a valuable source of food
20 for aquatic life. There are all kinds of bacteria and
21 fungi and invertebrates of one kind or another which
22 feed on leaves that are deposited in the streams,
23 particularly in small forested streams, and so that is
24 an important part of the food chain.

25 On the other hand, if you put in

1 excessive amounts, large amounts of fine organic
2 debris, that can be negative because it tends to impair
3 water quality and the way in which that happens is that
4 the debris decomposes, that process uses up dissolved
5 oxygen which is, therefore, less available for aquatic
6 life.

7 MR. FREIDIN: Mr. Chairman, this would be
8 an appropriate time for the afternoon break.

9 THE CHAIRMAN: Okay. We will take 20
10 minutes. Thank you.

11 ---Recess taken at 2:25 p.m.

12 ---Upon resuming at 2:50 p.m.

13 THE CHAIRMAN: Thank you. Be seated,
14 please.

15 MR. FREIDIN: Okay.

16 Q. Dr. Allin, I would like to move on to
17 the next potential effect of harvest and that deals
18 with the potential effect that harvest could have on
19 nutrients in the aquatic environment.

20 Dr. Allin, when you are considering the
21 addition of nutrients to the aquatic environment, are
22 there any particular nutrients which are more important
23 than others?

24 DR. ALLIN: A. Yes. Nitrogen and
25 phosphorus are the two most important nutrients.

1 Q. Okay. I would like to deal firstly
2 with phosphorus. Could you tell me: What is the
3 concern regarding the addition of phosphorus to the
4 aquatic environment?

5 A. The concern is for the eutrophication
6 of water bodies.

7 Q. And could you explain what you mean
8 by eutrophication?

9 A. Yes. Eutrophication is the
10 enrichment of a water body through the addition of
11 nutrients and that is a natural occurrence because
12 nutrients do enter water bodies naturally without any
13 disturbance necessarily being involved, but it is a
14 process which can lead to excessive growth of algae and
15 water quality problems.

16 Q. And does that --

17 A. I am sorry, I should add that it
18 also, in some cases, can actually lead to a change in
19 fish species or even a loss in fish species if a water
20 body becomes too eutrophic.

21 Q. Could you give an example of that
22 occurring or how that can occur?

23 A. Yes, I can. And I have an overhead
24 that does that.

25 MR. FREIDIN: Mr. Chairman, in the

1 errata - the exhibit number which I will give you in a
2 moment - there is reference to a change being made on
3 page 856, Figure No. 3.

4 The errata is Exhibit 435 and we are
5 looking for a change in page 856, and I believe the
6 last document which was attached to Exhibit 4350 is in
7 fact a reproduction with very minor changes to the
8 Figure 3 which you will find on page 856.

9 Q. Now, before you commence into this
10 explanation, Dr. Allin, could you just advise the Board
11 what the difference is between Figure 3 on page 856 and
12 the attachments to the errata, the errata being marked
13 Exhibit 435?

14 DR. ALLIN: A. Well, the only change is
15 that -- is one to the legend. The top box in the
16 legend that refers to warmer than 10 degrees Celsius
17 should have been stippled in the diagram to indicate
18 that it refers to the top layers of water in the
19 figure.

20 MR. FREIDIN: Not one of the major
21 changes that we have made, Mr. Chairman, but necessary.

22 Q. Okay. Could you then explain how
23 this eutrophication can have this result of -- has the
24 potential to affect the loss of some fish species?

25 DR. ALLIN: A. Yes. The figure is

1 intended to show changes in the amount or volume of
2 lake trout habitat during the period of thermal
3 stratification. And I should also add that the reason
4 that I would use or choose lake trout for this example
5 is that it is probably the most sensitive fish species
6 that we have in Ontario to this particular effect.

7 The figure is a highly schematic diagram
8 of the cross-section of a lake. Down one side is depth
9 and across the top are the months ranging from May
10 through to September, and to explain this effect I need
11 to at least briefly discuss the process of thermal
12 stratification.

13 As the water warms during spring - April
14 and May - most deep lakes undergo what we call thermal
15 stratification which basically means that two layers of
16 water form in the lake which are indicated in the
17 figure by the wavy lines on top, in the top layer, and
18 the blue portion in the bottom layer. They are in fact
19 separated by a zone right here of rapid change of
20 temperature. It is called the thermocline and during
21 the course of the summer, the thermocline deepens; that
22 is, it progresses deeper down in the waters of the lake
23 so that in June it is at a greater depth than it is in
24 May.

25 And the relevance of all of this relates

1 to both temperature and oxygen. Lake trout as a fish
2 species that has very stringent requirements both for
3 temperature and oxygen. Basically lake trout can live
4 in waters warmer than 10 degrees Celsius or at least
5 those are the temperatures in which they do best, 10
6 degrees Celsius or cooler; they also require a high
7 level of dissolved oxygen, basically greater than five
8 milligrams per litre.

9 Now, during the early spring and summer
10 lake trout, because of their temperature requirements,
11 are confined to the bottom waters; that is, those
12 waters that are cooler than 10 degrees Celsius, but the
13 other important point is that as the summer progresses
14 dissolved oxygen that is contained in these bottom
15 waters indicated by the blue area is used up through
16 the decomposition of algae and other material.

17 And the fact that a thermocline is
18 established in the lake prevents any more oxygen being
19 introduced into these bottom waters because,
20 effectively, the bottom waters are isolated from the
21 top waters.

22 These two layers do not mix because of
23 thermocline, so that there can be no oxygenation of the
24 bottom waters from the atmosphere. So that the amount
25 of oxygen that is contained in the bottom waters at the

1 start of the summer is the only oxygen that's present
2 and that gets used up, as I say, through the process of
3 decomposition.

4 Now, that process of decomposition uses
5 up dissolved oxygen, so that towards the end of the
6 summer and early fall in some -- at least in some lakes
7 the dissolved oxygen levels fall to below five
8 milligrams per litre that are required by the lake
9 trout.

10 This puts the lake trout in some
11 difficulty because they are confined to waters that are
12 cooler than 10 degrees and confined to waters that have
13 more than five milligrams per litre of oxygen. So, in
14 essence, they are squeezed up into this blue area which
15 is reduced in volume as the summer progresses.

16 The relationship to all of this to
17 nutrients is that additional inputs of nutrients,
18 particularly phosphorus in this case, will increase the
19 growth of algae in the surface waters up here. Those
20 algae live only a short time; they die, fall to the
21 bottom and decay and that process uses up more
22 dissolved oxygen. So that in a case where excessive
23 amounts of nutrients are added to the lake, the lake
24 trout volume -- the suitable lake trout volume can be
25 reduced substantially and, in fact, if it is reduced

1 enough lake trout can actually be eliminated from the
2 lake.

3 Q. Could you advise why phosphorus is
4 particularly important in this process of
5 eutrophication?

6 A. Yes. phosphorus is the key nutrient
7 to the growth of algae, at least in Ontario waters
8 because it is what we call the limiting factor. It is
9 the nutrient that is in shortest supply of all of the
10 nutrients in a lake.

11 So that additions of phosphorus to a lake
12 have a much larger effect on the growth of algae and
13 the eutrophication process than do any other nutrients.

14 Q. Is there a potential for phosphorus
15 to get into water or into the aquatic environment as a
16 result of timber harvest?

17 A. Yes. There are three possible ways
18 in which phosphorus can enter lakes as a result of
19 timber harvest.

20 The first is through erosion and
21 sedimentation. Phosphorus is a material that adheres
22 or absorbs very well to soil particles, and I think Mr.
23 Armson referred to this in Panel 9. So phosphorus
24 being absorbed to soil particles can enter water
25 courses if erosion and sedimentation occur.

1 The second way in which phosphorus can
2 enter surface water is through inputs of organic debris
3 because leaves, twigs and other portions of the organic
4 debris do contain phosphorus and this is another
5 potential source of phosphorus to lakes or streams.

6 And, finally, the third way in which
7 phosphorus can enter lakes as a result of harvest,
8 potentially is through leaching of phosphorus into the
9 lake or stream in the groundwater.

10 Q. Now, in relation to the first two
11 potential ways that phosphorus can get into the water,
12 you mentioned sedimentation and inputs of organic
13 debris. Is either one of those sources a concern if
14 the Fish Habitat Guidelines and the Code of Practice
15 are followed?

16 A. No, neither would be a concern in
17 that situation.

18 Q. And could you explain why not?

19 A. Well, basically because both the
20 guidelines and the Code of Practice will prevent or
21 minimize inputs of sediment and debris which could
22 result from timber harvest.

23 Q. The third source that you
24 mentioned -- potential source of phosphorus was
25 leaching. Are the Fish Habitat Guidelines effective in

1 reducing phosphorus inputs to water bodies through
2 leaching in groundwater?

3 A. I'm sorry. Are you asking me whether
4 that is a mechanism that commonly occurs?

5 Q. No, I am asking whether there is
6 anything in the Fish Habitat Guidelines which would
7 have any role in terms of limiting or addressing a
8 concern that one might have about phosphorus entering
9 the water through groundwater; entering the aquatic
10 environment through groundwater?

11 A. Yes. There is some question about
12 how effective the guidelines would be in addressing
13 that particular issue.

14 If we presumed a situation where we had a
15 fairly extensive clearcut and a lakeshore reserve, then
16 I would not expect that the reserve would prevent the
17 entry of phosphorus into the lake simply because the
18 reserve itself would probably not have much effect on
19 the groundwater flow and that is basically how
20 phosphorus would be entering if leaching were the
21 mechanism.

22 Q. Are you able to indicate, Dr. Allin,
23 which proportion of phosphorus which is added to
24 streams as a result of timber harvest enters through
25 leaching?

1 A. I can't really give you a firm figure
2 in terms of the proportion of phosphorus that would
3 enter through leaching. There is some evidence that
4 much of the phosphorus that enters a lake after
5 harvesting, enters as a result of erosion and
6 sedimentation or the entry of debris.

7 For example, there is one study in New
8 Hampshire which showed that 90 per cent of the
9 phosphorus in the stream following a clearcut in that
10 case was in a particulate form which means that either
11 it was attached to soil particles or it was attached to
12 organic particles of the type that could result from
13 the entry of leaves and other debris.

14 Q. Is that in any way surprising to you?

15 A. No, it isn't. And the reason is
16 that, as I mentioned earlier, phosphorus does absorb
17 very readily to soil particles and, as a result, it is
18 not very leachable; that is, it does not easily
19 dissolve in groundwater to the point where it could be
20 carried out into a lake in the groundwater.

21 Q. And were you here to hear the
22 evidence of Mr. Armson in relation to the subject
23 matter of phosphorus leaching?

24 A. Yes, I was.

25 Q. All right. And do you believe that

1 your evidence is consistent with the evidence that he
2 gave during Panel No. 9?

3 A. Yes.

4 THE CHAIRMAN: Dr. Allin, if the Fish
5 Guidelines and the Code were not that effective, in
6 your view, in necessarily preventing leaching of
7 phosphorus into lakes and rivers and streams, what
8 about other guidelines like the Tourism Guidelines,
9 because doesn't phosphorus arise in that form through
10 disposal of waste from, say, tourist camps and septic
11 tank systems and that kind of thing, and would some of
12 the other guidelines prohibit or have provisions that
13 would minimize phosphorus going into water bodies, not
14 necessarily involved per se with timber harvest, but
15 some of the other guidelines; would that also help?

16 DR. ALLIN: Well, certainly waste
17 disposal systems are a potentially very important
18 source of phosphorus. It, I think, would depend on the
19 nature of the waste disposal facility.

20 If, for example, you had a large tile
21 field that was within an area that was largely forested
22 or where you had, in essence, a reserve between the
23 tilebed and the lake, I would certainly expect that the
24 trees would minimize any loss of phosphorus through
25 taking it up.

1 MR. FREIDIN: Q. Dr. Allin, before we
2 continue to examine this matter of the potential effect
3 of phosphorus entering the aquatic environment, would
4 you describe the differences between an increased load
5 of phosphorus on the one hand and an increased
6 concentration of phosphorus on the other?

7 A. Yes, I can try to define both
8 concentration and load.

9 Concentration of something refers to the
10 amount or weight of that substance per litre of water
11 at a fixed point in time. So that if you went out and
12 took a water sample on Monday that would give you -- or
13 could give you a measure of the phosphorus
14 concentration in the water on that particular day.

15 Phosphorus loading is something
16 different; that is the total amount or weight of a
17 material such as phosphorus that is -- or that enters a
18 stream over a given time period. It is often measured
19 in studies in units of kilograms per hectare per year.
20 So it is a total weight of the material that enters
21 surface water.

22 Q. And can you describe the effects of
23 natural disturbance on phosphorus concentration in
24 streams?

25 A. There is some information on that.

1 There is a reference in the witness statement to a
2 paper by Schindler et al in 1980 which was a study in
3 the experimental lakes area in which he and others
4 studied the effects of both a windstorm and wild fire
5 on the concentrations of phosphorus in streams in the
6 area.

7 Q. Now, you referred to the experimental
8 lakes area. What is that?

9 A. It is an area located between Dryden
10 and Kenora in which the Federal Department of Fisheries
11 and Oceans has a research station and has done many
12 studies on the effects of phosphorus acidification and
13 other phenomena.

14 MR. FREIDIN: Now, Mr. Chairman, I don't
15 believe that Dr. Allin will be referring specifically
16 to the text, but the reference to the Schindler article
17 that he did make is found on the last full paragraph on
18 page 853.

19 Q. Now, I think you were going to
20 describe -- or perhaps you could describe that study
21 for us, Dr. Allin?

22 DR. ALLIN: A. I guess the essential
23 point of that study was that phosphorus concentrations
24 in the streams in the area increased following the wild
25 fire, but that that increase did not lead to a

1 significant effect on the water quality of the lake
2 downstream.

3 Q. And that particular fire, was it --
4 how was it described by Schindler in his article?

5 A. The words he used to describe it
6 were: "extremely hot"; in other words, it was an
7 intense fire.

8 Q. And could you, Dr. Allin, advise how
9 the increase in phosphorus in streams following fire,
10 as reported by Mr. Schindler, compared to the increase
11 following timber harvest?

12 A. Yes. The best way to do that, I
13 think, is to compare the results of Schindler's study
14 of the effects of wild fire with the results of
15 Nicholson et al in 1982 which addressed the effects of
16 clearcutting on phosphorus levels in streams.

17 And I think the reason that it is the
18 best comparison is because both studies were carried
19 out in almost the same area, they were both carried out
20 in the experimental lakes area, not the same
21 watersheds, but the watersheds were very close
22 together.

23 Q. And is that paper by Nicholson the
24 1982 paper referenced in your material?

25 A. Yes, it is.

1 Q. Is the actual report in your
2 material, or is it just referenced?

3 A. I believe it is in the witness
4 statement for another panel, but I am not sure which
5 one.

6 Q. Okay. Well, perhaps we will come
7 back to that later. If you could just continue then
8 and compare those two studies.

9 A. Yes. I have an overhead in which I
10 would like to use to compare those results.

11 MR. FREIDIN: If, Mr. Chairman, the
12 overhead entitled: Inputs of Phosphorus to Surface
13 Water could be marked as Exhibit 4...

14 THE CHAIRMAN: That will be 454.

15 ---EXHIBIT NO. 454: Overhead entitled: Inputs of
16 Phosphorus to Surface Water.

17 DR. ALLIN: So this is the comparison of
18 the inputs of phosphorus to streams and the data which
19 I am comparing here relates to changes in average
20 phosphorus concentrations in stream water following
21 disturbance and in one case the disturbance is
22 clearcutting and the other case it is wild fire.

23 MR. FREIDIN: Q. And this deals with the
24 concentrations as opposed to loadings?

25 DR. ALLIN: A. That's right.

1 Q. Okay.

2 A. The units that are involved here, or
3 what actually has been measured is total phosphorus.
4 In other words, these authors have measured all forms
5 of phosphorus that are in the streams, and that means
6 dissolved particulate, organic and inorganic. So all
7 forms of phosphorus which they -- or which I have
8 lumped together as total phosphorus.

9 The units that we are speaking of here
10 are micrograms per litre and that equates, Mr.
11 Chairman, to parts per billion. So we are dealing with
12 very small units.

13 Addressing, first of all, the
14 clearcutting experiment in northwestern Ontario. This
15 was a clearcutting operation that involved essentially
16 a complete clearcut of the small watershed that was
17 being studied. And the other point I think that is
18 important with respect to that study is that there were
19 no reserves used along the streams, so that the streams
20 were not protected in any way and virtually the whole
21 watershed was clearcut.

22 In terms of the results that were
23 reported by Nicholson et al, what they did was to study
24 watersheds that were uncut, watersheds that had been
25 cut for one year, and watersheds that had been cut for

1 a subsequent number of years.

2 Now, in this particular case the control
3 level here indicated as 12 micrograms per litre is the
4 level of total phosphorus that they found in the uncut
5 watershed. So that is sort of the background for the
6 baseline level.

7 Q. And that would be measured in a
8 stream?

9 A. That's correct.

10 Now, the level of total phosphorus in the
11 one year clearcut; in other words, this harvested
12 figure refers to streams in watersheds that had been
13 clearcut for one year and, in that particular case, the
14 level of total phosphorus was higher, it was 24
15 micrograms per litre. That is really the clearcut
16 story.

17 If we now move on to address the wild
18 fire results. As I indicated before, this was a fairly
19 intense fire in much the same area as where the
20 clearcutting study was carried out, and Schindler and
21 his co-workers studied two watersheds both of which
22 were burned in the same fire and they behaved somewhat
23 differently.

24 In what I have called watershed A -- and
25 I should mention that in this particular study,

1 Schindler happened to be studying the levels of
2 phosphorus and other nutrients in these streams before
3 the wind and fire hit the area, so that fortuitively he
4 had information on levels of phosphorus in these
5 streams before the disturbance.

6 So in this first watershed the level of
7 phosphorus was 26 micrograms per litre before the
8 disturbance, and after it rose to 61 micrograms per
9 litre, after this fire, and that occurred I believe in
10 the second year following the fire. In the other
11 watershed he studied, the level rose from 20 to 29
12 micrograms per litre.

13 What I would make from all of this is
14 that basically looking at these results as a whole,
15 certainly the results are within the same order of
16 magnitude, in fact, I would characterize them as being
17 fairly similar in terms of the actual increase in level
18 of phosphorus that occurred. And, if anything, one of
19 the watersheds that was burned did show a somewhat
20 higher level of phosphorus concentration after the
21 fire.

22 Just as a point of reference for the
23 Board. I have indicated here the water quality
24 guideline for streams that the Ministry of Environment
25 has established, it is 30 micrograms per litre. So you

1 can see that in the case of the clearcutting and in the
2 case of one of the burned watersheds, the average
3 phosphorus levels did not increase above that
4 guideline.

5 They did in one of the other watersheds,
6 but certainly one would expect some variation among
7 watersheds, in the response you would expect to see
8 somewhat different numbers.

9 MRS. KOVEN: Do these data represent a
10 single measurement or are they a compilation or average
11 of a few points?

12 DR. ALLIN: They are the average of a lot
13 of points.

14 MR. FREIDIN: Q. And in your evidence
15 when you refer to levels of phosphorus, you are
16 referring to concentrations of phosphorus?

17 DR. ALLIN: A. That's correct, it is the
18 same thing.

19 Q. All right. So if we could move then,
20 Dr. Allin, from discussing concentrations of phosphorus
21 to loadings of phosphorus. Is there sufficient
22 information to predict the phosphorus loadings which
23 can result from harvest?

24 DR. ALLIN: A. No, there is not
25 sufficient information to determine that particular

1 point.

2 Q. And is that matter going to be
3 addressed in terms of future study?

4 A. Yes. The effects will be measured in
5 the effects monitoring program that we have referred
6 to.

7 Q. In the interim, between now and the
8 time that some results are produced as a result of that
9 monitoring program, do you believe that there is a need
10 to change timber management practices?

11 A. No, I don't.

12 Q. Why not?

13 A. Well, the evidence we have indicates
14 that the increase in phosphorus concentrations
15 following harvest is fairly low, even without the use
16 of reserves and, as I indicated, in the Nicholson study
17 there were no reserves maintained on those streams.

18 Another point I think that is relevant is
19 that the increase in phosphorus concentrations is very
20 short term. Elevated concentrations following the fire
21 occurred only in the first year. The concentrations
22 had returned to the preharvest levels by the second
23 year. So that I think are the key points about
24 phosphorus concentrations.

25 Now, if we consider loading, although

1 there are increased amounts of phosphorus entering
2 streams after clearcutting for some time, these
3 increased amounts of phosphorus were associated with
4 high streamflows.

5 In other words, the water yield continued
6 to remain elevated in the subsequent years. So that
7 although you have phosphorus continuing to enter the
8 system, it is doing so with a larger volume of water.
9 So the result would be that in terms of a downstream
10 lake, the phosphorus concentrations in that lake would
11 be very marginally affected.

12 Q. When one is comparing the results of
13 phosphorus additions to water, loadings of phosphorus,
14 and you are comparing that from natural disturbance on
15 the one hand to conditions that might result from
16 clearcutting on the other, you have indicated that one
17 fact of importance when looking at that Nicholson study
18 with respect to the clearcutting was the fact that
19 there were no reserves around the water bodies, in
20 fact, the fire went up to the water's edge?

21 A. Yes, that's correct.

22 Q. Is there anything else about the
23 Nicholson study which you think is of importance to
24 keep in mind when you are comparing the Nicholson
25 study, which was phosphorus loading after clearcutting,

1 and the Schindler paper that was looking at it -- and
2 the Schindler paper?

3 A. After fire?

4 Q. After wild fire, yes.

5 A. Yes. Well, I think another
6 significant point in relation to the Nicholson study
7 was that he describes the soils in that area as being
8 sandy and phosphorus does -- although it adheres to
9 soil particles very well, that is not so true of sandy
10 soils, it does not adhere to sand as well as it does to
11 finer soils.

12 So that in the case of the Nicholson
13 study, in some ways, the conditions there are conducive
14 to the leaching of nutrients, perhaps more conducive
15 than other sites would be.

16 Q. Okay. I think you indicated that the
17 second nutrient which was of particular importance in
18 terms of additions to the aquatic environment was
19 nitrogen?

20 A. Yes, that's correct.

21 Q. And if I could refer you to page 852
22 of the witness statement you refer, in the last full
23 paragraph on that page, to a study in New Hampshire
24 which in fact referred to high nitrate levels being
25 found in that particular study not having been observed

1 in studies that examined the effects of timber harvest.

2 Is nitrates associated with nitrogen?

3 What is nitrates, or what are nitrates?

4 A. Nitrates are a form of nitrogen, it
5 is nitrogen combined with oxygen.

6 Q. And is there a concern about nitrates
7 entering the aquatic environment?

8 A. Well, yes. The concern about
9 nitrates in water relates to the safety of drinking
10 water. Very high levels of nitrates can be harmful to
11 human health.

12 Q. If I can refer you back to page 852,
13 you state that:

14 "In that New Hampshire study nitrate
15 levels in the streams following
16 deforestation exceeded recommended levels
17 for drinking water."

18 What is meant by deforestation in that context?

19 A. Deforestation, as it was used by the
20 authors of that particular paper, refers to the actual
21 clearcutting of trees; in other words, removal of all
22 of the forest cover, but the trees were simply felled
23 and left on the ground.

24 The other part about this experiment -
25 and I should emphasize that in fact it was an

1 experiment, it wasn't a study of the effects of timber
2 harvesting, because this was not harvesting, the wood
3 was not removed - but the other aspect of this
4 experiment that is important, in addition to the fact
5 that the trees were felled and not removed, the area
6 was sprayed with herbicides for three years in order to
7 prevent the regrowth of vegetation.

8 Because the authors were not interested
9 in the effects of clearcutting, they were interested in
10 the effects of the forest cover or lost forest cover in
11 this case on nutrient cycling in the terrestrial
12 environment. So it was very much an experiment done
13 for very specific scientific purposes.

14 Q. And the results of that?

15 A. In that particular situation the
16 authors found a dramatic -- very dramatic increase in
17 the level of nitrates in the streams draining those
18 particular watersheds where the deforestation went on.
19 The nitrate levels in fact exceeded the drinking water
20 objectives of 10 milligrams per litre for an extended
21 period of time, almost for the complete period of time
22 that the herbicides were used, those three years.

23 Q. Can you describe, Dr. Allin, the
24 levels of nitrates which might result from timber
25 harvest?

1 A. Yes. The results are quite variable
2 depending upon where the study has been carried out,
3 but invariably the levels resulting from harvest have
4 been smaller than those that were observed in the
5 deforestation experiment, and I do have an overhead
6 that deals with that.

7 MR. FREIDIN: Perhaps, Mr. Chairman, the
8 overhead entitled: Inputs of Nitrates to Surface Water
9 could be marked Exhibit 455.

10 THE CHAIRMAN: Very well, Exhibit 455.

11 ---EXHIBIT NO. 455: Overhead entitled: Inputs of
12 Nitrates to Surface Water.

13 DR. ALLIN: This overhead indicates the
14 changes in average nitrate concentrations in stream
15 water following clearcutting. And what I have done is
16 to summarize the results from a number of studies, both
17 in New England and in Ontario, to provide a comparison
18 of results.

19 What was measured in these experiments
20 was nitrate/nitrogen. The units involved are in
21 milligrams per litre and that is the equivalent of
22 parts per million, so somewhat larger than the units
23 that we were discussing for phosphorus.

24 The study by Martin et al 1984
25 essentially summarized the results for a number of

1 studies in New England which involved a number of
2 states looking both at hardwood and coniferous forests,
3 and looking at the average results for northern
4 hardwoods, the control level of nitrate/nitrogen, as
5 you can see, is quite low. It is less than 0.5
6 milligrams per litre.

7 Following clearcutting, because that was
8 what was involved in these studies, the level rose to
9 an average of two milligrams per litre and I have
10 indicated here by this symbol that the maximum of value
11 that was observed in those studies of hardwoods was 6.1
12 milligrams per litre. So that is the largest figure
13 that I have ever seen in the literature as it relates
14 to nitrate/nitrogen levels following harvest.

15 And as you can see, compared to the
16 drinking water objective, which is 10 milligrams per
17 litre, even that very highest level that was ever
18 observed is still somewhat below the objective.

19 If we look at what happened in the
20 coniferous forest of New England, there the levels of
21 nitrate essentially did not change, they remained at
22 less than 0.5 milligrams per litre.

23 Moving to Ontario, although we don't have
24 results for hardwoods in Ontario, we do have results
25 for two different locations which are characterized by

1 coniferous forest. This particular study, indicated by
2 the No. 2, is the study by Nicolson et al 1982 which we
3 were just referring to in terms of phosphorus.

4 In this particular case, the control
5 level or at least the levels of nitrate in the uncut
6 watersheds was again low, 0.05 milligrams per litre and
7 you can see that in the harvested watersheds the
8 nitrate level actually declined rather than increased
9 as it did in the hardwoods in New England.

10 Looking at the other site in northcentral
11 Ontario, again the study by Nicolson, this was in the
12 Lake Nipigon area, the control level was 0.08 and,
13 again, there was actually a decline in nitrate levels
14 in the harvested areas.

15 So that summarizes the results. You can
16 see that the results for conifers are different within
17 the New England examples which are perhaps the most
18 comparable and the results for coniferous forest in
19 Ontario are extremely low.

20 MR. MARTEL: What would account for the
21 decrease, Dr. Allin?

22 DR. ALLIN: I have asked myself that same
23 question, and I have also asked others that same
24 question and no one can really explain it.

25 THE CHAIRMAN: What would you expect the

1 results to be in a hardwood harvest in Ontario?

2 DR. ALLIN: In Ontario. I would expect
3 the nitrate levels to be quite low, and the reason I
4 say that relates to evidence given by Dr. Armson in
5 Panel 9 that, in fact, nitrification in acidic soils is
6 inhibited and the reason that happens is that the
7 nitrifying bacteria cannot multiply and cannot carry
8 through the process of nitrification very well in
9 acidic soils.

10 And our soils, as I understand it, tend
11 to be more acidic than the soils in New England, even
12 our hardwood soils.

13 MR. FREIDIN: Q. Considering these
14 results, Dr. Allin, do you believe that there is a real
15 concern for nitrate levels as a result of harvest?

16 DR. ALLIN: A. No, I do not.

17 Q. Now, the addition of nutrients is
18 another effect or potential effect which you indicated
19 could have either positive or negative effects. Could
20 you explain how that could occur, how you could get
21 either, or why there would be a positive and a negative
22 effect?

23 A. Yes. An increase in the input of
24 nutrients, and here I am referring specifically to
25 phosphorus, generally increases lake productivity, what

1 we call primary production, the growth of algae.

2 Where the natural productivity of the
3 lake is low, a limited amount of phosphorus added to a
4 lake of that kind could be beneficial in increasing the
5 lake's productivity. That would be true only up to a
6 point, and then the addition of nutrients would lead to
7 problems that I have already discussed, excessive
8 growths of algae, lower levels of dissolved oxygen and
9 so on.

10 The nature of the effect that happens
11 depends, of course, on the natural level of nutrients
12 in the water before there is any disturbance, it
13 depends also on the magnitude of the increase in
14 nutrients and how long that increase input lasts.

15 Q. I would like now to move on to
16 another potential effect that you identified and that
17 is the potential effect of acidification of the aquatic
18 environment.

19 Mr. Armson in Panel No. 9 dealt with
20 acidification of soil and the potential for increased
21 acidity in waters due to the flow of groundwater. Now,
22 if I could refer you to page 858 of the witness
23 statement, Dr. Allin, and in particular the first full
24 paragraph. Perhaps we could take a moment and read
25 that:

1 "Changes in stream acidity are
2 potentially significant to aquatic life.
3 Declines in pH from approximately 6.0 to
4 5.0, as reported in one study (Nicolson
5 1975) may be harmful to many species,
6 some of which disappear in this range of
7 acidity levels."

8 Referring to a study by Mills and Schindler 1986:

9 "Conversely, increases in pH may be
10 beneficial to aquatic life. However, the
11 nature, extent and duration of pH effects
12 as a result of harvesting are presently
13 uncertain and the significance of these
14 effects is unknown."

15 On the previous page, you indicate in approximately the
16 middle of the page -- starting in about the centre of
17 the page there is a sentence -- well, actually let's
18 start it with the margin. We will go down nine lines
19 in that full first -- that first paragraph where it
20 says: "The removal of forest cover..." Do you have
21 that spot?

22 A. Yes, I do.

23 Q. It says:

24 "The removal of forest cover by timber
25 harvesting or other disturbance disrupts

1 the cycling of hydrogen and other ions
2 among soil, litter and growing trees. In
3 the short term this disruption may affect
4 the acidity of waterbodies."

5 THE CHAIRMAN: Mr. Freidin, I think the
6 court reporter is trying to follow you.

7 MR. FREIDIN: All right.

8 THE CHAIRMAN: You are going a bit fast.

9 MR. FREIDIN: I will go right back to the
10 beginning.

11 "The removal of forest cover by timber
12 harvesting or other disturbance disrupts
13 the cycling of hydrogen and other ions
14 among soil, litter and growing trees. In
15 the short term this disruption may affect
16 the acidity of waterbodies. Results of
17 watershed studies are extremely
18 variable."

19 Q. And I believe that they go on and
20 explain that there have been increases and decreases in
21 pH following clearcutting; is that correct?

22 DR. ALLIN: A. That's correct.

23 Q. All right. If we take a look at the
24 two quotations or sections from your paper that I have
25 referred to, can you explain the significance of the pH

1 levels in these studies, both increasing and
2 decreasing?

3 A. Yes. In fact, we have done that in
4 relation to an interrogatory from the Ministry of
5 Environment.

6 Q. Is that the Interrogatory No. 19 for
7 Panel 10?

8 A. Yes, it is.

9 MR. FREIDIN: Could we mark that as the
10 next exhibit, Mr. Chairman.

11 THE CHAIRMAN: Okay. Exhibit 456.

12 MR. FREIDIN: What is that exhibit
13 number, Mr. Chairman?

14 THE CHAIRMAN: 456.

15 ---EXHIBIT NO. 456: Interrogatory No. 19 of MOE.

16 MR. FREIDIN: Q. Dr. Allin, could you
17 then perhaps comment on the significance of these
18 variable results in terms of acidification of water?

19 DR. ALLIN: A. Yes. The results of
20 studies in which stream pH has been measured following
21 clearcutting have been extremely variable.

22 In some cases there has been a
23 significant decline in pH; in other words, an increase
24 in water acidity. In other cases, there has been very
25 little change, and in still other cases, the pH of

1 streams has actually increased; in other words, water
2 acidity has decreased. So the results are extremely
3 variable.

4 If we look first at the significance of
5 decreases in pH; in other words, increasing acidity,
6 that can be harmful to many forms of aquatic life,
7 particularly as pH declines from 6.0 to 5.0 because
8 many species disappear in that range of pH, and that
9 would include a wide variety of invertebrates and some
10 species of fish.

11 The nature of the effect, again, will
12 depend on the initial pH of the stream itself, the
13 magnitude of the decrease in pH and the species
14 involved because some species of aquatic life are more
15 sensitive to acidification than are others.

16 On the other hand, as I have indicated,
17 there are situations in which pH has been observed to
18 increase; in other words, the water acidity has gone
19 down, and that would be interpreted as a positive
20 effect, particularly where the initial pH was
21 relatively low. So, for example, if you went from a pH
22 of 5.0 to 6.0, that would in fact benefit aquatic life.

23 I guess the bottom line in all of this is
24 that given the variable results of the experiments done
25 to date, the effect of timber harvesting on pH is

1 totally unpredictable, is how I would characterize it,
2 so the impact of harvesting in that respect is quite
3 uncertain.

4 THE CHAIRMAN: What if you go from 7.0 to
5 8.0? For instance, if you are treating a lake for acid
6 precipitation with, say, limestone or lime, can you
7 cause problems with aquatic life if you go the other
8 way, too high?

9 DR. ALLIN: Not if you are going to pH
10 8.0, that would be quite suitable for aquatic life.
11 The provincial water quality objective for pH is a
12 range from 6.5 to 8.5, so that's the desirable level.
13 But if you went beyond that - and I think that would be
14 very unlikely - you could also result in problems.

15 MR. FREIDIN: Mr. Chairman, I would ask
16 everybody to take their Exhibit 456 and remove the
17 second page which has absolutely nothing to do with
18 this particular question or answer. Interesting, but
19 nothing to do with this question or answer.

20 DR. ALLIN: If I might, Mr. Freidin,
21 there is one small error.

22 MR. FREIDIN: Not in the page I have just
23 crumpled up, I hope.

24 DR. ALLIN: I am not sure about that.

25 MR. FREIDIN: Okay.

1 DR. ALLIN: But in the answer to that
2 interrogatory, a very minor thing, but in the second
3 paragraph of the answer, the second last line there is
4 a reference to Nicolson et al 1988. That should read
5 Nicolson et al 1982. Just in case someone might be
6 confused about what papers we are referring to here.

7 MR. FREIDIN: Q. Right. And the other
8 reference to Nicolson, '88 is correct?

9 DR. ALLIN: A. That's right.

10 Q. Will use of the Fish Habitat
11 Guidelines have any effect with respect to the concern
12 for increasing water acidity, Dr. Allin?

13 A. I don't believe that the use of the
14 guidelines would have any significant effect on water
15 acidity and the reason I say that is that the way in
16 which water acidity would increase, if it does - and,
17 as I say, the results are really variable - would be
18 for hydrogen ions to be transported through the soil in
19 the groundwater. And trees that are left in a reserve
20 on a lakeshore would not affect that because they would
21 not take up hydrogen ions through their root system.

22 So that, in essence, they would not
23 affect either the transport or the entry of hydrogen
24 ions into surface water.

25 Q. Has any consideration been given by

1 the Ministry to modifying harvest operations because of
2 possible changes in water acidity due to harvesting?

3 A. Well, the matter has been considered.
4 The feeling is that there is not sufficient
5 justification to require a change in practice at this
6 time simply because the results of studies have been so
7 extremely variable and unpredictable. And in fact, in
8 some cases, as I say, stream pH has actually increased,
9 acidity has been decreased which would be a positive
10 effect.

11 Q. And I understand that this
12 possibility of a connection between harvesting and
13 acidification of waterbodies, although it is uncertain
14 to the degree that you have indicated, is a matter
15 which the Ministry of the Environment has indicated to
16 you has been of some concern to them?

17 A. That's correct.

18 Q. And am I correct that they have
19 basically agreed with the view that you have just
20 indicated that the Ministry of Natural Resources has,
21 that the understanding of these potential effects is
22 insufficient to warrant a change in operational
23 procedures at this time?

24 A. Yes, that's correct.

25 MR. FREIDIN: Mr. Chairman, I am

1 referring to Exhibit 5A, the very first paragraph of
2 Attachment No. 3. I don't think we have to take the
3 time to go to it. I have referred to it I think on
4 earlier occasions.

5 Q. I would like to move on to what I
6 believe is the last potential effect of harvest on
7 aquatic environment that you listed, Dr. Allin, that is
8 the potential effect of a change in water temperature.

9 And I think you probably have explained
10 this particular matter in theory through your examples
11 of removal of trees from the edge of waters. I am not
12 too sure, I don't recall whether you explained how an
13 increased stream temperature could be both positive or
14 negative for aquatic life.

15 So perhaps you could just address that
16 issue?

17 A. Yes, and I have an overhead that
18 addresses that.

19 THE CHAIRMAN: Exhibit 457.

20 MR. FREIDIN: This is an overhead
21 entitled: Water Temperatures -- Water Temperature.

22 ---EXHIBIT NO. 457: Overhead entitled: Water
23 Temperature.

24 DR. ALLIN: In dealing with the positive
25 or negative potential effects of increasing stream

1 temperature, the first point to make is that it is
2 difficult, if not impossible in most situations, to
3 separate the effects of temperature from the effects of
4 increased light and nutrients. And the reason that is
5 the case is that when you do remove tree cover near
6 streams and, therefore, lead to an increased water
7 temperature in summer, you are of course at the same
8 time increasing the amount of light that reaches the
9 stream and, in some cases, increasing the amount of
10 nutrients.

11 So that all of these effects tend to
12 occur together and the response that you measure in the
13 stream will reflect all three factors. So that it is
14 very difficult to separate these effects.

15 But looking at it in terms of
16 temperature, the effects of increased stream
17 temperature may be positive or negative and the nature
18 of the effect depends upon a number of factors, which I
19 have listed there:

20 The natural temperature regime, the
21 magnitude of the increase in temperature and the
22 temperature tolerance of the species because there is a
23 great -- there are great differences in the tolerance
24 of fish species, for example, to temperature. Brook
25 trout or lake trout obviously prefer colder

1 temperatures than do bass.

2 Now, the increase may be positive if the
3 initial stream temperature is below the optimum for the
4 particular species that you are dealing with. And, in
5 that event, a small increase in temperature may lead to
6 increased plant production and may also lead, in some
7 cases, to increased production of invertebrates and
8 fish.

9 That would normally be of particular
10 benefit to warm water species where the existing levels
11 were below optimum for their health and well being, but
12 in some cases even cold water species could benefit to
13 some extent, provided that the increase in temperature
14 was very limited and that the initial temperatures in
15 that cold water stream were low.

16 On the other hand, the increase in stream
17 temperatures can be negative if the initial
18 temperatures are already at or close to the optimum for
19 the species involved. This is particularly a problem
20 for cold water streams where the temperatures in summer
21 may already be marginal or borderline for trout.

22 So where in fact you do have an increase
23 in temperature and you are already at the optimum
24 level, that is most likely to lead to a decreased
25 production in terms of invertebrates and fish and, in

1 an extreme case, could lead actually to a change in
2 species competition; in other words, warm water species
3 could eventually replace cold water species.

4 Q. Now, Dr. Allin, before we leave the
5 subject matter of water temperature, could we just turn
6 to page 856 of the witness statement. I am taking you
7 back to your description of eutrophication and the
8 thermocline. Do you have that?

9 A. Yes.

10 Q. I just wanted to clarify an answer
11 that you gave. I am not too sure whether I have got it
12 correct, but in terms of lake trout, what is the
13 temperature that they like or that they exist best at?

14 A. Well, temperatures cooler than 10
15 degrees Celsius.

16 Q. All right.

17 THE CHAIRMAN: Dr. Allin, when you refer
18 to changes in specie composition, you are referring to
19 the replacement of one specie with another as opposed
20 to a specie adapting to a different set of
21 circumstances; or are you?

22 DR. ALLIN: That's correct. Species can
23 adapt to a limited extent to a small increase in
24 temperature, but certainly if you increase the
25 temperatures by a large amount, cold water species will

1 not survive those conditions and would eventually be
2 replaced by something else.

3 MR. FREIDIN: Q. Dr. Allin, I would like
4 to move on now to one of the tools that you indicated
5 in your evidence that the Ministry of Natural Resources
6 has which, in fact, addresses the concern for
7 protection of fish habitat and water quality from the
8 potential effects of timber management, and that
9 document is Exhibit 333, Timber Management Guidelines
10 for the Protection of Fish Habitat.

11 I believe that you described this
12 document, Dr. Allin, as not the only tool that the
13 Ministry has, but is probably the major tool that it
14 has to protect aquatic values from the potential
15 effects of timber management activities?

16 DR. ALLIN: A. That's correct.

17 Q. And the use of that particular
18 guideline, I understand, is governed by a policy of the
19 Ministry of Natural Resources?

20 A. Yes, that's right.

21 Q. And is that policy Exhibit 304 which
22 is entitled: Use of the Timber Management Guidelines
23 for the Protection of Fish Habitat?

24 A. Yes, it is.

25 Q. That is the guideline I believe -- or

1 the policy that I reviewed with Mr. Ward at some length
2 in Panel No. 7, particularly in relation to the minimum
3 information requirements?

4 A. That's correct.

5 Q. Okay. You also indicated at the
6 outset that you were the prime author of these
7 guidelines?

8 A. Yes.

9 Q. Could you explain how the guidelines
10 were developed and, in particular, what I am interested
11 in are the people and organizations which were
12 involved, the sources of information, the general
13 approach you took in terms of developing these
14 guidelines?

15 A. Yes. And, again, I have an overhead
16 to do that.

17 MR. FREIDIN: It is the fourth page I
18 think of the package, Mr. Chairman. Perhaps we could
19 mark the overhead entitled: Development of Fish
20 Habitat Guidelines, Sources of Information as the next
21 exhibit.

22 THE CHAIRMAN: Very well. That will be
23 Exhibit 458.

24 ---EXHIBIT No. 458: Overhead entitled: Development of
25 Fish Habitat Guidelines, Sources
of Information.

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DR. ALLIN: The Fish Habitat Guidelines were developed using a number of sources of information. First of all, of course, the scientific literature which, as I have indicated, provides a wealth of information concerning both potential effects on the aquatic environment as well as measures that can be taken to protect against the adverse effects.

The second source of information was advice from experts both inside the Ministry and outside. And within the Ministry, primarily I am referring to fisheries biologists both in the area of research and management. They provided input in terms of fish habitat requirements, the need for fish habitat protection. Those were the primary areas in which they provided advice.

We also consulted with a number of foresters within the Ministry in terms of the nature of timber management practices as they are carried out in Ontario and what the potential effects may be.

We also consulted with experts in a number of other ministries. The Ministry of Environment was consulted with respect to water quality concerns and the need for protection of water quality. We also talked to our counterparts in the federal

1 government with the Department of Fisheries and Oceans
2 with respect to both the effects of timber management
3 and the various protection measures that could be
4 taken.

5 And the last group that I have indicated
6 there is the Canadian Forestry Service. Some of the
7 researchers such as Nicholson that I have been
8 referring to who have done studies in this area worked
9 with the Canadian Forestry Service and we spoke with
10 them with respect to the effects of various timber
11 management practices.

12 Q. In terms of the Department of
13 Fisheries and Oceans, were any of the authors of any of
14 the papers that you have referred to in your evidence
15 involved in providing advice during the preparation of
16 the Habitat Guidelines -- the Fish Habitat Guidelines?

17 A. I am sorry, Mr. Freidin, would you
18 repeat the question?

19 Q. You referred to a number of papers -
20 I will be specific - Mr. Schindler or Dr. Schindler.
21 Was he involved in terms of providing advice during the
22 time that you were preparing the Fish Habitat
23 Guidelines?

24 A. Yes. I spoke with him concerning a
25 number of concerns in relation to timber management.

1 Q. Okay. Perhaps you could continue
2 then and deal with the approach used in other
3 jurisdictions?

4 A. Okay. We also, in developing the
5 guidelines, looked at the approach that is used in
6 other jurisdictions. For example, New Brunswick, in
7 order to get ideas on their particular concerns with
8 respect to timber management and ideas on how to
9 protect aquatic values.

10 The last source of information that I
11 have listed is observations and experience in the
12 field. This relates both to my own observations and
13 those of a great many other people.

14 Basically, again, within the Ministry
15 talking to fisheries biologists with respect to their
16 concerns for effects of timber management on fish
17 habitat and ways of protecting fish habitat and then
18 consulting with foresters with respect to various
19 timber management practices and what those effects
20 might be with respect to water.

21 Q. And those discussions with biologists
22 and foresters, would those have been primarily with
23 field people who are engaged in those two occupations?

24 A. Yes, they were.

25 Q. Were the Fish Habitat Guidelines

1 reviewed by anyone prior to them being approved as a
2 provincial guideline?

3 A. Yes, they were.

4 Q. Can you explain that review process,
5 please?

6 A. Yes. And, again, I would like to use
7 an overhead.

8 MR. FREIDIN: Can we mark the overhead
9 entitled: Review of Fish Habitat Guidelines, Review as
10 Exhibit 459, Mr. Chairman.

11 THE CHAIRMAN: Exhibit 459.

12 ---EXHIBIT NO. 459: Review of Fish Habitat Guidelines
13 Review.

14 DR. ALLIN: Drafts of the Fish Habitat
15 guidelines were reviewed by a great many people from a
16 great many organizations.

17 Within the Ministry itself, the
18 guidelines were reviewed primarily by biologists and
19 foresters but, in some cases, by others as well. The
20 guidelines were also reviewed by other ministries, in
21 particular, the Ministry of Environment, Tourism and
22 Recreation and Transportation.

23 The guidelines were also reviewed by
24 outside government agencies, in particular, the
25 Canadian Forestry Service. And the guidelines were

1 further reviewed by a great many organizations outside
2 government, noticeably the Ontario Forest Industries
3 Associations, but also a great many interest groups who
4 were on the mailing list for the Timber Environmental
5 Assessment, and that included groups such as NOTOA,
6 OFAH, FON and a number of others.

7 And finally the guidelines were reviewed
8 by participants at the ESSA workshops. I don't think I
9 need to go into that again, you are familiar with that
10 situation.

11 MR. FREIDIN: Q. Could you advise: Were
12 any changes made to the draft guidelines based on that
13 review?

14 A. Yes, there were some changes made.
15 Changes were made both to the guidelines and to the
16 Fisheries Policy itself that governs the use of the
17 guidelines in order to explicitly identify the
18 objective of protecting water quality as well as fish
19 habitat.

20 There were also some changes in the
21 content of the guidelines with the express purpose of
22 protecting water quality. And finally the Fisheries
23 Policy, which was in a draft form at that stage, was
24 amended to specifically identify the waters to which
25 the guidelines would apply.

1 Q. And the Policy again is Exhibit 304?

2 A. Yes.

3 Q. And the changes or the amendments
4 which were made to the guidelines -- or the draft
5 guidelines as a result of concerns raised by the
6 Ministry of the Environment, do we find those
7 particular amendments described in Exhibit 5A which is
8 the May 5th, 1988 letter from Mr. Douglas to Messrs
9 Posen and Balfour and, in particular, Attachment 3 of
10 that exhibit?

11 A. Yes, that's correct.

12 Q. And do you have that particular page
13 in front of you, Dr. Allin?

14 A. Yes, I do.

15 Q. And could you advise where one finds
16 the changes -- well, in fact, let me put it this way:
17 There were a number of commitments in Item No. 2 in
18 relation to changing or amending the draft guidelines;
19 is that correct?

20 A. Yes. Are you referring specifically
21 to Attachment 3 now--

22 Q. Yes.

23 A. --as opposed to the covering letter?

24 Q. Well, perhaps, if you would like to,
25 perhaps just explain to the Board where they find a

1 list of the things which were in fact done, or changes
2 which were made to the draft as a result of concerns
3 raised by the Ministry of the Environment?

4 A. Well, the specific list of changes
5 that were made appears in Attachment 3 under No. 2.
6 For example, Item (i) which says that:

7 "The Ministry of Natural Resources will
8 develop a policy to direct a manner in
9 which the guidelines will apply."

10 And that was done and that is the Fisheries Policy that
11 we have been referring to, Exhibit 304.

12 Q. And there are a number of other -- in
13 fact, there are nine particular items listed under
14 that. And if I could just read to you, Dr. Allin, from
15 page 1 of Exhibit 5A, starting in the last full
16 paragraph it says:

17 "Concerns related to the subject of
18 effects of timber management on water
19 quality have been dealt with in some
20 detail. MNR and MOE have agreed on
21 a number of items which serve to resolve
22 the concerns expressed by MOE. These
23 include: MNR will make amendments to the
24 Timber Management Guidelines for the
25 Protection of Fisheries Habitat which

1 will afford greater protection for water
2 quality specifically. The amendments are
3 noted in the attached material."

4 And it refers to Attachment 3. And can I assume that
5 the amendments referred to are those items 1 through 2
6 under the heading: Timber Harvesting Close to Lakes
7 and Streams?

8 A. Yes, that's correct.

9 Q. Can you advise whether those
10 amendments were in fact made?

11 A. Yes, they were.

12 Q. And the note which is at the bottom
13 of 9 which says:

14 "MOE and MNR agreed that these measures
15 and actions are interim in nature and may
16 change as additional scientific evidence
17 becomes available."

18 Can you advise whether that is an accurate reflection
19 of your understanding that was reached -- of the
20 understanding which was reached?

21 A. Yes, it is.

22 Q. Thank you. Now, the actual
23 Guidelines for the Protection of Fish Habitat, Exhibit
24 303, do you have that in front of you, Dr. Allin?

25 A. Not at the moment. Yes, I have it.

1 Q. Okay. It has white pages and it has
2 green pages; right? Is that correct?

3 A. That's correct.

4 Q. Could you tell me what constitutes
5 the Fish Habitat Guidelines, the green portions of the
6 document or both the green and the white portions?

7 A. The green pages constitute the
8 guidelines.

9 Q. What do the white pages constitute?

10 A. Well, the white pages are entitled:
11 Background, and that is exactly what they are. They
12 provide background information that helps users of the
13 guidelines to appreciate the intent of the guidelines,
14 the potential concerns for effects of timber management
15 on fish habitat and water quality, and the background
16 also provides a rationale for why the guidelines say
17 what they say and are used in the way in which they
18 are.

19 Q. There are, I think, one white page
20 basically which precedes the green pages other than the
21 Table of Contents, and that perhaps I guess would fall
22 into a similar category as the background papers?

23 A. That's correct.

24 MR. FREIDIN: If I could just have one
25 moment, Mr. Chairman.

1 Q. In your earlier evidence, Dr. Allin,
2 you indicated that you have been unable to determine
3 under what specific circumstances each of the various
4 effects that you have referred to would move from being
5 positive to negative.

6 You said that you couldn't -- didn't know
7 that precisely. You indicated that you had been unable
8 to quantify or define a range within which that change
9 from positive to negative would occur, and I asked you:
10 In light of that uncertainty, what do you do as a
11 fisheries biologist who is concerned about protection
12 of the aquatic environment.

13 And your response was that there was a
14 need to be conservative and that you wanted to error on
15 the side of safety.

16 Are you indicating, Dr. Allin, that, in
17 your view, the Timber Management Guidelines for the
18 Protection of Fish Habitat are conservative?

19 A. Yes, I believe they are.

20 Q. And could you provide some examples
21 of that conservative approach?

22 A. Yes. There are several ways in which
23 the guidelines are used in a conservative fashion.

24 First of all, the widths of the areas of
25 concern that are prescribed in the guidelines are

1 conservative and by that I mean that the width of the
2 areas of concern that are specified in the guidelines
3 are somewhat larger than may be necessary in some
4 situations in order to protect aquatic values.

5 Another way in which the guidelines are
6 conservative is that for most cold water lakes and
7 streams a continuous reserve perhaps with a little bit
8 of modified cutting, selection cutting, is maintained
9 on those lakes and streams despite the fact that there
10 is some uncertainty about whether that level of
11 protection is really needed. And I would refer back to
12 my earlier statements about some cases in which a
13 little bit of warming of the stream might be
14 beneficial.

15 The third way in which the guidelines are
16 conservative is the way in which they are used and by
17 that I am referring to the minimum information
18 requirements which were explained in Panel 7 whereby if
19 certain information is not available to use the
20 direction in the guidelines in a very specific way,
21 then the guidelines are used in a very conservative
22 fashion, which essentially means that on those waters
23 where we don't have the requisite information, we would
24 maintain either a continuous reserve, no-cut reserve,
25 or we would permit only a limited amount of selection

1 cutting.

2 Q. And the minimum information
3 requirements - and I don't intend to take you there,
4 Dr. Allin - but can you confirm for me that they are
5 described in Exhibit 304 on page 2 of the Policy and
6 that the minimum information required for use of the
7 guidelines is knowledge in relation to fish species
8 present, critical fish habitats as defined in the
9 guidelines, and slope of shoreland areas?

10 A. Yes, that's correct.

11 Q. All right.

12 MR. FREIDIN: I don't intend to repeat
13 the evidence, Mr. Chairman, of Mr. Ward in that regard.

14 Q. One question arising from my
15 examination of Mr. Hynard, Dr. Allin. You may recall
16 that I had asked you whether you could comment on the
17 evidence of Mr. Hynard regarding my question about
18 selecting a few trees within an area of concern that
19 you harvested as opposed to selection cutting or
20 selection harvesting.

21 Do the guidelines address either of those
22 two activities?

23 DR. ALLIN: A. Yes, the guidelines do
24 address situations in which one of the harvesting
25 options would be limited selection cutting.

1 Mr. Hynard referred to the removal, as
2 you say, of a limited number of trees in terms of the
3 concerns with respect to the aquatic environment. As
4 long as that cut was light enough, if I can put it that
5 way, so as not to disturb the soil significantly, then
6 that would be an -- that would be acceptable from the
7 aquatic environment point of view, in my opinion, and
8 that is the sort of judgment that would have to be made
9 by the fisheries biologist in consultation with the
10 foresters on the planning team and others.

11 Q. So if Mr. Hynard -- I think he said I
12 have to consult the bio -- I take it then, you would
13 say that you would sit down with Mr. Hynard and consult
14 about that matter?

15 A. That's right.

16 Q. Okay. Going back to the widths of
17 the areas of concern which are recommended in the
18 guidelines, can you explain how those widths were
19 determined and why you consider them to be
20 conservative?

21 A. Yes. And, again, I have an overhead
22 to address that.

23 THE CHAIRMAN: Exhibit 460.

24 ---EXHIBIT NO. 460: Overhead entitled: Fish Habitat
25 Guidelines, Size of Areas of
 Concern.

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MR. FREIDIN: It is an overhead entitled:
Fish Habitat Guidelines, Size of Areas of Concern.

DR. ALLIN: Yes. You asked about the
conservative nature of the guidelines with respect to
the width of the areas of concern that are specified in
those guidelines.

The widths of areas of concern indicated
in the guidelines were taken from a paper by Trimble
and Sardz. These were authors who describe a study in
New Hampshire where they studied the transport of
sediment across a forest floor, in this particular case
it was from a road -- or roads, and they related the
distance that sediment travelled across the forest
floor to the degree of slope. So that they were trying
to establish a relationship between the distance that
was needed in order to filter out sediment that might
be generated from a source up the slope.

Perhaps, if I could refer to the
guidelines themselves. There is a portion here, if I
can find it.

Q. Page 9?

A. Yes, there is a portion here which
may help to explain the way in which the widths of
areas of concern were established. Trimble and Sardz

1 recommended what they called buffer widths for two
2 different situations:

3 For a general situation, that was
4 described as a situation in which some amount of
5 sedimentation of a stream could be tolerated; in other
6 words, not all of the sediment would be prevented from
7 entering the stream.

8 They also described a situation which
9 they described as the municipal watershed situation and
10 that was done in order to provide a higher level of
11 protection, one that would prevent any amount of
12 sediment from entering the stream and the objective
13 there being to maintain water quality at as high a
14 level as possible. And so they are really presenting
15 two situations, one of which is more restrictive than
16 the other.

17 And the point here is that the width of
18 areas of concern in the Fish Habitat Guidelines was
19 taken from the more restrictive situation in Trimble
20 and Sardz. So there is a degree of conservatism built
21 in in that respect. So that is the second point that
22 appears on the overhead.

23 The third point is that what we did was
24 to group slopes into four categories or ranges and then
25 to specify a width of area of concern for each of those

1 four groups of slopes. And we did that in order to
2 simplify the application, because the results of
3 Trimble and Sardz are expressed in the form of a graph
4 in which you would -- in order to apply it strictly as
5 they present it, you would have to know -- or you would
6 have to specify a different width of reserve for each
7 per cent increase in slope. And we just didn't feel
8 that was very practical to work with. So we grouped
9 the slopes into four categories and specified a width
10 of area of concern for each.

11 And the way in which we did that leads to
12 Point 4, that the size of areas of concern exceeds the
13 Trimble and Sardz recommendations for most slopes.

14 Now, that is not always true, but
15 generally it is true and it, again, makes the Fish
16 Habitat Guidelines somewhat more conservative than what
17 Trimble and Sardz proposed.

18 Q. Has the Ministry provided any
19 training in the use of these Fish Habitat Guidelines?

20 A. Yes. We have made presentations at a
21 number of workshops on timber management planning and
22 the audience there has been both Ministry and industry
23 staff. And, in more recent times, we have also begun
24 to provide more detailed training in the use of the
25 guidelines to Ministry biologists and foresters.

1 For example, just this past January there
2 was a workshop for biologists and foresters from the
3 northwestern and northcentral regions and I believe in
4 early April there is to be a similar workshop for the
5 northeastern region and, subsequently, there will be
6 similar types of workshops for the other regions.

7 The whole intent of this training is to
8 help people understand the intent of the guidelines,
9 first of all, and then to help them use the guidelines
10 correctly and consistently.

11 MR. FREIDIN: Mr. Chairman, if you are
12 going to have a break - if you want to keep going, I'm
13 not sure what you want to do - this would be a
14 convenient time.

15 THE CHAIRMAN: Well, how much longer have
16 you got with Dr. Allin?

17 MR. FREIDIN: Oh, maybe another hour. I
18 can tell you: We can probably, even if we ended now -
19 I think having regard to the amount of time that I
20 anticipate for Mr. Greenwood and Mr. Clark - that
21 stopping now will not in any way affect our ability to
22 finish by Wednesday.

23 THE CHAIRMAN: When you say finish by
24 Wednesday, when were you planning to finish on
25 Wednesday?

1 MR. FREIDIN: Well, if you are thinking
2 that we might be finished on Tuesday, Mr. Chairman...

3 THE CHAIRMAN: No, no, I am not thinking
4 that. I am wondering if we are going to go out on the
5 five o'clock plane Wednesday, or whether it would be a
6 late night departure.

7 MR. FREIDIN: I would suggest that you
8 book -- when you say, an earlier flight, what time are
9 you talking about? I never leave early, Mr. Chairman.

10 THE CHAIRMAN: The normal flight, 5:10.
11 Would that be the one we are trying to catch on
12 Wednesday?

13 MR. FREIDIN: Oh, you will catch the
14 5:10. I think you will catch the 5:10.

15 THE CHAIRMAN: Well, it's the 4:10 for
16 Sudbury.

17 MR. FREIDIN: Well, you can catch the
18 4:10, Mr. Martel, and you will catch the 5:10. I think
19 there is a good chance we can -- well, it is getting
20 close, but if I say we might finish by say quarter to
21 three -- 2:30, three o'clock on Wednesday.

22 THE CHAIRMAN: All right. Why don't we
23 do this: Why don't we take a break and then come back
24 and maybe try and finish Dr. Allin today.

25 MR. FREIDIN: Sure.

1 THE CHAIRMAN: And then we will at least
2 have Dr. Allin out of the way and then we can
3 concentrate on the other two tomorrow and Wednesday.

4 DR. ALLIN: Thank you, Mr. Chairman.

5 MR. FREIDIN: Sure. How long a break,
6 Mr. Chairman?

7 THE CHAIRMAN: Oh, let's say 15 minutes.

8 MR. FREIDIN: Thank you.

9 ---Recess taken at 4:35 p.m.

10 ---Upon resuming at 5:00 p.m.

11 THE CHAIRMAN: Thank you. Please be
12 seated.

13 Certain privileges, Mr. Freidin, we get
14 the blankets.

15 MR. FREIDIN: As long as it is not all
16 wet, Mr. Chairman.

17 Q. Okay. Dr. Allin, I would like to
18 move on to another topic which is still dealing with
19 the Fish Habitat Guidelines, Exhibit 303. Can the
20 timber management planning process result in a decision
21 which does not completely protect fish habitat?

22 And, perhaps putting the question another
23 way, Dr. Allin: Will tradeoffs ever be made in favour
24 of other values when, in fact, you are considering the
25 protection of fish habitat or water quality?

1 DR. ALLIN: A. Well, I would expect that
2 tradeoffs would be made in some cases, but only where
3 there is a very strong rationale for doing it. In
4 other words, it would be my expectation that that would
5 occur only in exceptional circumstances.

6 In Panel 7 there was a reference to
7 situations in which decision-makers were forced to
8 choose between the protection of a number of important
9 values, and I think the examples related to protecting
10 a fish habitat as opposed to an endangered species of
11 wildlife, or protecting a fish habitat as opposed to
12 providing access to a large area of timber in order to
13 provide socio-economic benefits.

14 Having said that, that in fact tradeoffs
15 will occur in exceptional circumstances, I think it is
16 important to recognize that providing less than
17 complete protection to fish habitat or some aquatic
18 value doesn't necessarily mean that you are going to
19 lose that value. And I think that the decision that
20 you make has to reflect the risk of harm to whatever
21 value it is that you are dealing with.

22 And an example of that would be placing a
23 spawning area at some risk by permitting a road to be
24 located within an area of concern so that it is in fact
25 situated fairly near a spawning area. Now, in that

1 particular case, the risk of harm would depend on the
2 importance of that particular spawning area.

3 Obviously if that is the only spawning
4 area available to a fish population, the impact could
5 be quite significant. On the other hand, if there are
6 a number of other spawning areas that the fish
7 population could also use, then the significance of the
8 impact would be reduced. So that the kind of decision
9 that you make very much depends on the particular
10 circumstances that you are dealing with.

11 The other thing that I would add in
12 relation to that is that even in the event that you did
13 cause siltation of a spawning bed, all is still not
14 lost because there would be, at least in most
15 circumstances, some way of remedying that situation.

16 And, in fact, we have done this in a
17 number of cases where we have gone in after the fact
18 and, in relation to siltation of spawning beds,
19 primarily after highway construction or road
20 construction, and actually cleaned up the spawning bed.
21 And we do that by flushing the area with fire hoses.

22 So, in that particular situation, even
23 though some damage was done to the habitat, it was
24 correctable.

25 Q. All right. I would like to refer

1 you, Dr. Allin, to Exhibit 303 which -- or the
2 guidelines, the Fish Habitat Guidelines, and if I could
3 just take you to the guidelines, the green section,
4 Section 5.1.

5 A. Yes.

6 Q. I want you to look at 5.1.1 which
7 says:

8 "Roads should not be constructed within
9 areas of concern."

10 Then 5.2. -- that is in relation to lake trout lakes,
11 self-sustaining brook trout lakes and aurora trout
12 lakes.

13 If we go to the next area, 5.2 the
14 heading is: Other Lakes, 5.2.1 has the same section or
15 wording, it says:

16 "Roads should not be constructed within
17 areas of concern."

18 But it has a difference in that it has the additional
19 sentence that reads:

20 "Exceptions may be considered where it
21 can be demonstrated that fish habitat
22 will be protected."

23 Is there any significance to the fact, Dr. Allin, that
24 in exceptional cases constructions of roads within
25 areas of concerns may be considered when in fact you

1 are dealing with other lakes, but according to the
2 wording of the guideline that exception is not
3 expressly provided for when you are dealing with lake
4 trout lakes, self-sustaining brook trout lakes and
5 aurora trout lakes when we look at 5.1.1?

6 A. Well, the omission of any reference
7 to exceptions for the lake trout situation was done
8 intentionally simply in order to discourage any
9 attempts to build roads near those more sensitive
10 lakes.

11 However, even in the case of lake trout
12 lakes there might have to be, under some exceptional
13 circumstances, an exception made to that for reasons
14 that we have discussed earlier where you are faced with
15 making tough decisions about one value versus another.

16 So that even in the case of lake trout
17 lakes, there might be the odd case where a road might
18 have to be located within an area of concern, but
19 certainly in cases like that I would expect the road to
20 be built with particular care and ways in which that
21 can be done are identified in the new Roads Guidelines
22 for Access Roads and Water Crossings.

23 Q. Thank you.

24 THE CHAIRMAN: Dr. Allin, refresh my
25 memory: Are these guidelines retroactive in the sense

1 that, would these prescriptions against the
2 construction of a road within an area of concern for,
3 say, a lake trout lake apply to a road that is already
4 in?

5 DR. ALLIN: No, they would not.

6 THE CHAIRMAN: Just for new construction?

7 DR. ALLIN: Yes, they would apply to new
8 plans, new timber management plans.

9 THE CHAIRMAN: Or anything since the date
10 of the guidelines, is that the idea?

11 DR. ALLIN: That's right.

12 MR. FREIDIN: Can I have one moment Mr.
13 Chairman, please.

14 Q. Dr. Allin, could I refer you to
15 Section 5.2.3 of the Fish Habitat Guidelines and, in
16 particular, subsection (c) and there is reference to a
17 situation where in fact one might cut to the shoreline
18 but the statement is made:

19 "With no more than 50 per cent of the
20 shoreline should be cut by these methods
21 and any clearcutting should occur where
22 feasible in non-contiguous blocks or
23 strips."

24 Do you see that section?

25 DR. ALLIN: A. Yes, I do.

1 Q. And that is for other lakes, that
2 means lakes other than lake trout lakes,
3 self-sustaining brook trout lakes and aurora trout
4 lakes?

5 A. Correct.

6 Q. You have a similar section I believe
7 on the next page, page 2 in Section 5.4.3, again in
8 subsection (c) where you have the same statement
9 restricting the amount of cut down to the shore?

10 A. Yes.

11 Q. Can you advise of the concern which
12 this provision is intended to address?

13 A. Yes. The concern that those
14 particular provisions is intended to address is water
15 quality, protection of water quality and the intent is
16 to provide some degree of protection for water quality
17 in all waters to which the guidelines are applied.

18 Q. Can you advise: Was the particular
19 provision that I referred you to about the 50 per cent
20 clause, one which was present before amendments were
21 made in response to the Ministry of the Environment
22 raising certain concerns?

23 A. No, it was not.

24 Q. And was the inclusion or the
25 amendment of the guidelines in order to contain such a

1 provision, one of the amendments which we will find
2 referenced in Exhibit 5A and, in particular, Appendix
3 No. 3 of that exhibit?

4 A. That's correct.

5 Q. And if I might - if you have that
6 document - could you confirm with me that that
7 particular amendment is referred to in Item No. 8 of
8 the proposed amendments which were to be made to
9 address concerns raised by the Ministry of the
10 Environment?

11 A. Yes, it is.

12 Q. Thank you. On page 866 and 867 of
13 the witness statement you have reproduced or you have
14 included two diagrams: One is Figure 4, Prescriptions
15 to Protect Water Quality and Fish Habitat on a Cold
16 Water Lake, and Figure 5, Prescriptions to Protect
17 Water Quality and Fish Habitat on a Warm Water Lake.

18 I understand, Dr. Allin, that you believe
19 that it would be helpful if you took a few moments to
20 speak to those two figures and basically explain what
21 they are intended to show?

22 A. Yes. I have a couple of overheads
23 that I would like to use for that purpose.

24 These two examples which Mr. Freidin
25 indicated are in the witness statement are intended to

1 show how the guidelines might be applied in two
2 different situations for a typical cold water lake and
3 a typical warm water lake.

4 And the guidelines treat those two
5 situations somewhat differently, simply because warm
6 water species are somewhat less sensitive in some
7 respects to the potentially adverse effects of timber
8 management than our cold water species. Cold water
9 species are more sensitive. So the figures provide an
10 example of how the guidelines would be applied to each
11 situation.

12 Beginning first with the cold water
13 lake - I guess you can't see the word - in fact it is
14 the cold water lake example.

15 Q. That's Figure 4 on page 866?

16 A. Now, these are hypothetical examples,
17 so I am going to have to make certain assumptions about
18 the particular situation that I am describing.

19 First of all, I will assume that this
20 lake is a lake trout lake for which the guidelines
21 provide very specific direction. I will also assume
22 that we have the minimum information that we need in
23 order to apply the guidelines in this particular case.

24 So that we know the fish species, for
25 example, we know that this is a lake trout lake, we

1 know something about the critical fish habitats, where
2 the spawning areas are and so on, and that we know the
3 shoreline slope in this situation. And I have
4 indicated on here what the slopes are on different
5 portions of the lake.

6 And in the right-hand side of lake I have
7 indicated where the slopes are more gentle, 0-8
8 degrees; in this upper portion the slopes are a little
9 steeper, 9-17 degrees; and on the left side of the lake
10 the slopes are higher still at 18- 24 degrees. And
11 these ranges of slopes that I have indicated correspond
12 to groupings of slopes in the guidelines.

13 I have to make one further assumption and
14 that is not a very realistic one, I must admit, but one
15 that I am going to make just for purposes of
16 simplifying the example. I will assume that all of the
17 timber on the shoreline of this lake has been
18 allocated. That is a very unlikely assumption for a
19 large lake trout lake but, nevertheless, just to
20 simplify things I will make that assumption.

21 Now, the Fish Habitat Guidelines would,
22 first of all, indicate that an area of concern would be
23 identified around the entire shoreline of that lake and
24 the width of the area of concern would be chosen
25 according to the guidelines that related to slope.

1 So that, for example, on the right-hand
2 side of the lake where slopes are 0-8 degrees, the area
3 of concern that would be identified would need to be
4 only 30 metres wide. Over here on the upper portion
5 where slopes are a little steeper, the area of concern
6 would be identified as 50 metres wide, and over here on
7 the steepest slopes the area of concern would be 70
8 metres. So that is how the guidelines are used to
9 identify where the area of concern is located and how
10 large it is.

11 Decisions are then made in developing
12 prescriptions for that area of concern as to what kinds
13 of timber management is going to occur. In the case of
14 lake trout lakes, there are not many options simply
15 because of the sensitivity of this particular
16 situation. The guidelines provide for only two
17 harvesting options, one of which does not involve
18 harvesting. The two options are no harvesting, in
19 which case the area of concern becomes a no-cut reserve
20 or where it is felt acceptable to do so, the area of
21 concern may have a certain amount of selection cutting,
22 and we referred to this earlier.

23 If that is the decision, that some amount
24 of selection cutting would occur within the area of
25 concern on certain portions of the lake then that, at

1 the end of the planning process, is referred to as an
2 area of modified operations.

3 The only other thing perhaps to comment
4 on in this example is the fact that we are concerned
5 not just about water quality in the lake itself, we are
6 also concerned about water quality of streams entering
7 that lake because, of course, that will affect the lake
8 itself. So that we will also extend the reserve or the
9 area with modified cutting up to the first permanent
10 basin or bog.

11 Now, that could be a lake, it could be a
12 pond or a wetland. The idea being that that basin
13 would trap sediment or debris or nutrients that might
14 be -- might result from operations upstream in this
15 area at the top of the figure. So we would not just
16 protect the lake, we would also protect the incoming
17 streams.

18 MR. MARTEL: Your modified operation,
19 what type of amount are we talking about, or is that
20 difficult to determine?

21 DR. ALLIN: It is difficult to determine.
22 That would involve a limited amount of selection
23 cutting, removal of a few trees or small groups of
24 trees, but that is the kind of thing that we referred
25 to earlier when we talked about discussions between

1 biologists and foresters in order to determine what
2 would be acceptable in a given situation.

3 MRS. KOVEN: And the ceiling on that is
4 50 per cent?

5 DR. ALLIN: No, the ceiling -- there is
6 no prescribed ceiling for that. The 50 per cent figure
7 refers to actual shoreline cutting, such as
8 clearcutting or shelterwood cutting, and I will show
9 you an example of that in the next figure.

10 That is the example of how the guidelines
11 might apply to a cold water lake.

12 MR. FREIDIN: Q. And perhaps before you
13 go to that, just for clarification, the guidelines
14 provide guidance in terms of the width in paragraph No.
15 2, I believe, of the guidelines which is page 1 and I
16 assume that that is where you got the various widths of
17 your areas of concern by looking at the slope of the
18 angle and degrees and then using the guidance that it
19 had in terms of widths of area of concern?

20 DR. ALLIN: A. Yes, that's correct.

21 Q. And in terms of the waters to which
22 the Fish Habitat Guidelines apply, do we find a
23 description of those waters in Exhibit 304, which is
24 the Policy and, in particular, page No. 2 of that
25 exhibit under the heading of Application?

1 A. Yes, that's correct.

2 Q. Okay.

3 MR. FREIDIN: Again, I won't repeat
4 those, Mr. Chairman, but they are there for your
5 reference.

6 Q. All right. If you could perhaps
7 proceed then with the second example.

8 DR. ALLIN: A. Yes, I would like to move
9 on to the warm water lake situation.

10 Q. And that particular overhead is
11 reproduced at page 867 of the witness statement.

12 A. In this particular case, again, I
13 have to make certain assumptions. And I will assume
14 that things are pretty much like they were in the cold
15 water lake situation just for simplicity sake. But, in
16 this case, we are dealing with a warm water lake and,
17 let's say, that it is a walleye pike lake which is a
18 very common type of lake in the area of the
19 undertaking.

20 We will assume again that we have the
21 minimum information in which to apply the guidelines,
22 so that we have fish habitat that we want to protect.
23 As I say, I am assuming it is a walleye pike lake. We
24 know where the critical fish habitats are, such as
25 spawning and nursery areas, and we also know the slope.

1 And for this example I am going to assume
2 that the slopes are the same as they were in the cold
3 water example; in other words, more gentle slopes on
4 this right-hand side of the lake and steeper slopes on
5 the left-hand side.

6 Again, I am going to assume that the
7 entire timber on the entire shoreline has been
8 allocated, again, not a very realistic assumption but
9 one that I would make for simplicity. In this
10 particular case we can be a little more flexible in
11 terms of the amount of cutting that occurs simply
12 because the species are not as sensitive as, say, a
13 lake trout.

14 The first priority in this particular
15 situation would be to protect what we call critical
16 fish habitats, things like spawning and nursery areas.
17 So in this particular case I am assuming that there is
18 rock/rubble off of this particular point on the lake
19 marked by "x"s, I am also assuming that there are some
20 rapids in this major inflowing stream and, furthermore,
21 that there are areas of aquatic vegetation near the
22 inlet of both incoming streams and also near the outlet
23 of the lake, but they could appear anywhere on the
24 shoreline.

25 As I say, the first priority would be to

1 protect critical fish habitats. That means that we
2 would want to maintain a reserve or perhaps, with a
3 certain amount of selection cutting adjacent to those
4 rock/rubble areas and vegetative areas, we would also
5 want to extend the reserve upstream in order to protect
6 the rapids because we know that walleye in lakes are
7 often strange spawners, they will leave the lake in the
8 spring, go up and spawn and then descend back down into
9 the lake again.

10 So we would protect the rock/rubble which
11 could be a spawning area for walleye, as well as the
12 rapids. We would also want to protect areas of aquatic
13 vegetation because they are important to a lot of fish
14 species in terms of feeding areas, in terms -- well, in
15 the case of pike, both spawning and nursery habitat and
16 also for walleye nursery habitat.

17 So that we would put first priority on
18 protecting those particular areas. And, as I say, we
19 would do that by maintaining either no-cut reserves,
20 which I have indicated here in green, or by providing
21 for an area of concern which there was again only
22 limited selection cutting, something that would not
23 disturb the area to any extent.

24 The difference between this and the lake
25 trout situation is that here we can be a little more

1 flexible. If there are areas of this lake - and here
2 is an example in this particular portion of the
3 shoreline - where there is no particular fish habitat
4 value, an example of that would be a sandy beach, then
5 a decision might be made in developing the timber
6 management prescription to permit more extensive
7 cutting in that area of the lake and that could be, for
8 example, shelterwood cutting or it could be strip
9 clearcutting.

10 And that is where the 50 per cent figure,
11 Mrs. Koven, that you were referring to comes in. That
12 kind of treatment of the shoreline of a lake would be
13 restricted to no more than 50 per cent of the
14 shoreline. So that covers the warm water example.

15 As I say, the emphasis is a little bit
16 different, but in both cases we are attempting to
17 protect both water quality and aquatic habitat.

18 MRS. KOVEN: Excuse me, I forget how we
19 calculated the reserves that were allowed for skyline
20 purposes when it came to the tourism guidelines.

21 DR. ALLIN: I'm afraid I can't help you
22 with that.

23 MRS. KOVEN: I was just wondering though,
24 these reserves, they would be of smaller width, they
25 wouldn't be a skyline width necessarily?

1 DR. ALLIN: No, that's true.

2 MRS. KOVEN: They would likely be
3 narrower than that?

4 DR. ALLIN: That's true. And certainly
5 in some situations where the tourism guidelines were
6 applied to one of these lakes that I have just shown
7 you, the reserves that they would establish might be
8 much more restrictive than what is required in
9 protecting the fish habitat.

10 MRS. KOVEN: So if you were a tourist
11 operator you would be better off arguing on the basis
12 of aesthetics than you would on protection of aquatic
13 life; I mean, if you wanted more trees standing at the
14 end of the day?

15 DR. ALLIN: Yes, that's right.

16 MRS. KOVEN: Does wild rice harvest
17 disturb aquatic habitat?

18 DR. ALLIN: Wild rice harvesting? No, I
19 don't believe it does. They are really just taking
20 the grains off the top of the stocks of the wild rice
21 plants and those plants do die and decay in any event
22 from one year to the next.

23 MRS. KOVEN: I was wondering if they
24 attracted fish. Do fish like living in wild rice?

25 DR. ALLIN: Yes, wild rice does provide

1 habitat for some species of fish, northern pike would
2 be an example.

3 MR. FREIDIN: The topic of tourism
4 guidelines, Mrs. Koven, will be addressed by Mr. Clark
5 either today or the day following.

6 Q. And just while we are talking about
7 the tourism guidelines, in the example that was given,
8 Mr. Clark, Dr. Allin said that the Fish Habitat
9 Guidelines might in fact allow one to cut right down to
10 the shoreline in a situation where there is no critical
11 habitat.

12 In the example he gave, he said if it
13 happened to be a beach, a sandy beach. Now, if that
14 sandy beach happened to be one frequented by
15 recreational users, would the fish habitat -- pardon
16 me, would the tourism guidelines address that
17 particular matter?

18 MR. CLARK: A. Yes, they would if that
19 issue was brought to the attention of the planning
20 team. And I think one of the things I will be talking
21 about tomorrow is the fact that more often than not
22 when you are dealing with waterbodies, like the one
23 that you saw in the example here, you are dealing with
24 a system of reserves which involve not only reserves
25 that speak to the aquatic environment, but they may

1 also speak to wildlife values such as moose, and in
2 addition to that, there may be tourism concerns.

3 So in many instances you will see all
4 three sets of reserves occurring on a particular
5 waterbody.

6 MR. FREIDIN: I would like to ask a few
7 questions about the Code of Practice, and which I
8 understand has been marked as Exhibit 434, and I am
9 going to bounce back a little bit between Mr. Oldford
10 and Dr. Allin.

11 As you are aware, Mr. Chairman, this
12 document was just finalized and available for filing
13 with the Board at the beginning of February, so it is a
14 relatively new document.

15 Q. And if I might start with you, Mr.
16 Oldford, could you describe what the Code of Practice
17 is?

18 MR. OLDFORD: A. Well, I would start,
19 Mr. Freidin, by saying that it is really nothing new.
20 It is a good attempt at putting to paper the practices
21 that have been followed, in my opinion, in the forests
22 of Ontario for quite a few years and it is designed to
23 be an educational tool to heighten the awareness of
24 those people that carry out those practices of renewal,
25 harvest, site preparation, particularly the field

1 foresters, the field foremen and the equipment
2 operators.

3 Q. And can you advise, or are you aware
4 as to why it was decided to, in fact, have a document
5 like this prepared, perhaps not to change practice, but
6 to heighten the awareness of certain people within the
7 operations within riparian areas?

8 A. Yes. I can remember when the concern
9 was first expressed and there was thought to be a need
10 for this type of document. Both Ministry of Natural
11 Resources people and Ministry of the Environment people
12 felt that it was -- it would be a benefit.

13 I guess you can write a plan for an area
14 of concern. You can lay it out in a way that you are
15 going to approach an area of concern, but when you get
16 right on the site it is nice to have a little more -- a
17 few more specifics that you can address.

18 For instance, an operator can be on the
19 site and working in an area adjacent to water bodies in
20 a riparian area and the approach that he takes in that
21 area might be different on a dry day than on a wet day
22 and this sort of lays out some of this information.
23 There is reference to a number of factors.

24 Q. All right. And I guess a little
25 later on we will have you take the Board through that

1 Code of Practice.

2 Dr. Allin, are you aware of who
3 participated in developing this code?

4 DR. ALLIN: A. Yes. The Code was
5 developed by Ministry staff with input from both the
6 Ministry of Environment and the Ontario Forest
7 Industries Associations.

8 Q. And could you advise: What is the
9 relationship between the Fish Habitat Guidelines and
10 the Code of Practice?

11 A. Well, the two are used together. The
12 Code is used in conjunction with the -- both the Fish
13 Habitat Guidelines and the Fisheries Policy that
14 governs the use of the guidelines.

15 As I've described, the guidelines are
16 used to identify where areas of concern will be
17 established around water bodies, and then the
18 guidelines are used to help determine what operations
19 will take place within those areas of concern.

20 In some cases, as I indicated in the warm
21 water example particularly, operations will occur
22 within the area of concern. And I guess an example of
23 that would be the strip clearcuts near a shore, and it
24 is in that kind of situation where operations are going
25 to be occurring near water where the Code of Practice

1 provides a direction on how to carry that out without
2 impairing water quality.

3 Q. And I believe there is reference in
4 the Policy for the use of the Timber Management
5 Guidelines for the Protection of Fish Habitat, Exhibit
6 304, in the second paragraph of that particular
7 document. Can you just confirm that, Dr. Allin?

8 Exhibit 304, second paragraph.

9 A. Yes. I have it.

10 Q. There is indication in the last three
11 lines that:

12 "Additional operational measures to
13 protect water quality and fish habitat
14 are contained in the Ministry's Code of
15 Practice for Timber Management Operations
16 in Riparian Areas."

17 And I take it that refers to the Code we are talking
18 about?

19 A. Yes, it does.

20 Q. Could you assist by defining or
21 indicating what riparian areas are within this
22 particular Code of Practice?

23 A. Yes. The riparian areas referred to
24 in the Code of Practice refer to areas of concern that
25 have been identified through the use of the Fish

1 Habitat Guidelines.

2 In other words, they apply to -- or at
3 least the riparian areas that are referred to in the
4 Code refer to areas near water, around those waters
5 that are defined in the policy and are those waters to
6 which the guidelines are applied.

7 Q. Mr. Oldford, can you advise whether
8 the use of the Code of Practice is mandatory?

9 MR. OLDFORD: A. I guess I would like to
10 come back to the point, Mr. Freidin, that I believe the
11 observance of the Code of Practice is a little more
12 than good common sense and the purpose of the Code of
13 Practice is to heighten the awareness of staff, both on
14 the part of the Ministry and on the part of the
15 industry that are working in those areas.

16 I guess more importantly it is important
17 to achieve the objectives that have been laid out for
18 the particular area of concern and know, as far as the
19 Code of Practice goes, we are not looking at a
20 rulebook, but we are listing a number of factors, a
21 number of considerations that an operator or a foreman
22 would have to take into account on a particular site on
23 that particular day that he's operating.

24 Q. And where would one find the
25 objective of the area of concern?

1 A. In the timber management plans.

2 Q. In what portion? I mean, we have
3 heard about prescriptions for areas of concern.

4 A. In the prescription, yes.

5 Q. Is that where we find it?

6 A. Yes.

7 Q. Could you just give me an example of
8 what a prescription might say about protecting a water
9 body, you know, as a result of certain activities being
10 allowed - modified operations within an area of
11 concern - and how the sort of matters that might get
12 considered, once you got to the site, perhaps by
13 reference to the Code of Practice might vary from the
14 level of information one would find in the
15 prescription?

16 A. Well, I could give you an example. I
17 hadn't planned to.

18 But suppose that a 30-metre buffer was
19 being left on a lake and that within that buffer there
20 had been a decision made that a number of the pine
21 trees could be removed because there would be enough
22 residual left in the reserve to afford the protection
23 that the objective was to afford and the plan was that
24 the equipment operator could go in there with a
25 skidder, work right up close to the reserve and use a

1 cable in a certain way.

2 Now, suppose that this operator ends up
3 in there on a day when -- a day that has been preceded
4 by two or three days' of rain. He may decide, and I
5 would say the field foreman would decide: Great, there
6 is a reserve there, but we are not going to operate in
7 it today, we are not even going to operate in it with a
8 longer main line on the skidder, we are just going to
9 leave it, we are going to leave right at the reserve
10 and go to another place and come back when things dry
11 out a little bit.

12 So it is good common sense, good judgment
13 that we are looking to impress upon field staff. And
14 what we are doing really is re-emphasizing that. That
15 is there right today.

16 But I believe this whole exercise that we
17 are going through with respect to timber management is
18 to heighten the awareness and try and raise the
19 standard even further.

20 MS. SWENARCHUK: Mr. Chairman, sorry to
21 interrupt, but point of clarification. Are we to
22 understand that there is a Code of Practice currently
23 in effect?

24 MR. FREIDIN: We will get to that.

25 Q. Is flexibility built into this Code?

1 MR. OLDFORD: A. Yes, it is, because for
2 all of these things to work it will depend upon the
3 good judgment of the people that are in the field
4 implementing the activities.

5 Q. And I understand that in terms of the
6 monitoring of operations in areas of concern and in
7 riparian areas will be the subject matter of Panel No.
8 16?

9 A. Yes, and it will be done in
10 conjunction with regular area inspections and, in the
11 case of areas of concern, they will probably be
12 specific inspections.

13 Q. Again, we will get more detail of
14 that in 16?

15 A. That's correct, sir.

16 Q. I understand we will probably also be
17 talking about that a little bit in terms of the role
18 that this document might play in terms of areas of
19 concern in Panel 15?

20 A. Yes.

21 Q. Okay. Are you aware as to whether
22 there is any commitment to training in relation to this
23 particular Code of Practice?

24 A. Well, as with other documents that we
25 develop from time to time, the document in itself or

1 the position that we take is not very useful unless it
2 is transferred to the people that must deliver it and
3 we do have a plan for training.

4 That is something that we are going to
5 have to work out with the industry. They are very
6 particular about training and developing and
7 understanding in their own people, but on the renewal
8 side and on Crown management units we will be working
9 with our foresters too.

10 I would expect that we will probably
11 build a training into part and parcel of our regular
12 timber management planning training exercises.

13 Q. Could you advise: Is the Code being
14 used at the present time?

15 A. Well, the Code as it's written is to
16 be implemented April 1, 1990, but to just leave it that
17 way I think it would be unfair to all the people that
18 are out there operating in the forest today and; that
19 is, the industry and government field foresters,
20 foremen and equipment operators.

21 For the most part, and my professional
22 opinion, this Code is in place right now and what we
23 are really talking about is raising our -- heightening
24 our awareness, setting new goals, new challenges to
25 raise the standard of operation.

1 Q. When you say that it is in place
2 right now, are you referring to the fact that you
3 believe people are carrying out activities which, if
4 examined against the Code, would comply with the Code?

5 A. Yes.

6 Q. Dr. Allin, if I might, just a very
7 few brief questions about effectiveness of the
8 guidelines. Perhaps before I go on, I note on the
9 front of Exhibit 434 there is a note that says:

10 "This Code has been approved and is in
11 the process of being placed into policy."
12 And the document is dated February the 1st, 1989.

13 In a very general sense, are you able to
14 indicate what is meant by that, that the Code has been
15 approved and is in the process of being placed into
16 policy?

17 MR. OLDFORD: A. Mr. Freidin, you are
18 looking at me but you did mention Dr. Allin's name.

19 Q. All right. I am looking at you, I
20 meant to say Mr. Oldford.

21 A. What we are doing right now, Mr.
22 Chairman, with respect to the Code is: We are
23 reviewing it internally amongst a number of people that
24 have key concerns within forest resources group and
25 eventually somebody within that group will have the

1 responsibility of writing the particular policy
2 documents to put it into place.

3 And then, in addition, within that group
4 somebody will be charged with the responsibility of
5 developing a training plan and deciding whether it fits
6 into the regular timber management training exercise,
7 and then we will also have someone dealing with the
8 industry to make sure that the industry has the same
9 understanding of this Code that we do, and that the
10 industry then develops their own training exercises
11 that again - and I want to re-emphasize this - are
12 designed to just raise the awareness that is out there
13 today.

14 Q. Could you take a few moments, Mr.
15 Oldford, and perhaps just take the Board through this
16 particular document, Exhibit 434, just to give them a
17 sense of the subject matters that it refers to and
18 perhaps an indication of why you believe that what it
19 provides for is, in fact, good practice which is being
20 followed at the present time?

21 A. With respect to this Code titled:
22 Code of Practice for Timber Management in Riparian
23 Areas we have identified, I guess in conjunction with
24 the Ministry of the Environment, a need to reinforce
25 and elevate the standards that we have out there today

1 if we are going to meet the stringent objectives that
2 we are setting with respect, say, to water quality.

3 And with respect to this Code, what we
4 are looking to do really is to improve the standard to,
5 I guess so to speak, to strive for excellence and to
6 improve our already good practices.

7 The first page of the Code:

8 "The primary objective for timber
9 management practices in the vicinity of
10 water bodies is to minimize soil and site
11 disturbance."

12 And that is the intent of the Code. I think that is
13 quite explicit.

14 And the second paragraph on that first
15 page:

16 "The need has been identified by both the
17 MNR and the MOE to explicitly protect
18 water quality."

19 I think that is fairly clear.

20 In the third paragraph we talk about the
21 primary audience of the Code being the local foresters,
22 local forest technicians, area supervisors and machine
23 operators. These are the people that, on a day-to-day
24 basis, can make things really work well or, if they are
25 not well-informed of the particular needs, of good

1 forest management, good timber management practices,
2 they can make it difficult to attain objectives. So
3 there is an education process in here.

4 The fourth paragraph on that page deals
5 with the factors that we are going to make sure that
6 the operators and the people on site are thinking about
7 as they move through their operations on a day-to-day
8 basis; factors such as slope, soil characteristics,
9 vegetative cover, season of openings and equipment.

10 The sixth paragraph on that page
11 essentially says what we are looking at is good common
12 sense applied properly in the field.

13 Moving to page 2, we deal with slopes
14 specifically and the statement I believe is quite
15 clear:

16 "Harvest and renewal equipment must be
17 used in such a way as to minimize the
18 removal of residual vegetative cover and
19 to avoid excessive exposure of mineral
20 soil on steep slopes in order to prevent
21 the establishment of erosion channels."

22 As we raise the awareness and give our field people the
23 understanding of the objectives that we are striving
24 for, I believe we will attain a much enhanced level of
25 timber management in the field.

1 Moving on to page 3, we talk about soil,
2 soil texture and moisture. And, as I mentioned a
3 little earlier in the example dealing with removing
4 trees from a reserve, there is a need for flexibility
5 because under real life forest conditions soil/moisture
6 levels vary very much with the season and very much
7 with weather events like rain.

8 Item 3 on page 3 we deal with season of
9 operation and the fact that certain soils, certain
10 sites are more susceptible to rutting and compaction
11 under certain -- under the different seasons of the
12 year.

13 Page 4, we deal with equipment. And late
14 last week quite a bit of my presentation to the Board
15 dealt with different types of equipment operating on
16 different soil types and the ways that machine
17 operators could avoid site damage.

18 And what we are talking about there, as
19 you move down through the discussion on that page, is
20 the sensitive sites mentioned a couple of times. We
21 are talking about the sites where erosion, rutting or
22 compaction, as a result of all of the factors that we
23 have mentioned in this Code, might cause the site to be
24 disturbed in a manner that would not allow us to
25 achieve our objectives. And quite naturally, as you

1 work further down a slope, there are generally higher
2 moisture contents down there.

3 Part 5 on page 4, when I read that, and I
4 read items (a), (b), (c), (d) and (e) I think of,
5 really, this is just re-emphasizing some of the old
6 ways we have been operating for some time. In other
7 words, like Item 5(a):

8 "Trees must not be felled into water
9 bodies at any time of the year."

10 That standard has been there for a long time. I can
11 remember cutting approvals in 1974-1975 that emphasized
12 that. I can remember having talked to operators who go
13 back and, you know, remove an incidental tree that was
14 in a creek and had been reported.

15 Page 5 dealing with implementation. We
16 touched on that, the need for training and
17 communication and (d) on page 5, monitoring and
18 enforcement. I believe monitoring and enforcement is
19 necessary. More importantly than monitoring and
20 enforcement is having a commitment to implement it and
21 having people that are right on the front line
22 understanding just what we are out to do.

23 And I guess, finally, I would say that I
24 know most of those -- or a lot of those people that
25 work out there in the forest, and if we give them an

1 understanding of the new objectives that we are
2 striving for and the fact that we are looking to raise
3 the standards, I am certain it will be achieved.

4 Q. Now, Dr. Allin, I would like to go
5 back to you. Just a few questions about the
6 effectiveness of the Fish Habitat Guidelines. Evidence
7 was given earlier that the Fish Habitat Guidelines will
8 be addressed in the effects monitoring program arising
9 from the ESSA project. And is my understanding
10 correct?

11 DR. ALLIN: A. Yes, it is.

12 Q. And in your opening when you went
13 through your lists of major messages, you made one
14 comment that in terms of the effectiveness of these
15 guidelines that you can't say they are effective with
16 scientific certainty.

17 And my question is: That although you
18 are unable to state with scientific certainty how
19 effective these guidelines are until the effects
20 monitoring program is carried out, do you believe that
21 the potential effects which the guidelines are designed
22 to prevent will occur if the guidelines were followed?

23 A. I would expect that the effects would
24 occur to a certain extent, perhaps to a measurable
25 extent, but I would not expect those effects to be

1 significant.

2 Q. And on what basis is that opinion
3 formed; that is, that the effects of timber management
4 are not expected to be significant where the Fish
5 Habitat Guidelines have been properly applied?

6 A. Well, my opinion is based on two
7 things in the main: The fact that the guidelines were
8 developed using the best scientific information that we
9 have available to us, and the fact that they are, by
10 nature, conservative and they are used in a
11 conservative way.

12 And I would only add to that that the use
13 of the Code of Practice and the use of good practices
14 when operations are carried out near water will also
15 help to prevent or minimize effects and specific
16 effects relating to erosion, sedimentation and possible
17 inputs of organic debris.

18 Q. Now, if the Board was considering
19 whether it should impose a term or condition which
20 would affect the timber management activity of harvest,
21 Dr. Allin, if the Fish Habitat Guidelines are applied
22 properly and the Code of Practice is used, do you
23 believe that any term or condition should be imposed by
24 this Board on the timber management activity of harvest
25 in order to protect aquatic life?

1 A. No, I don't.

2 Q. Do you have anything you would like
3 to add, Dr. Allin, because if you don't those are all
4 the questions I have for you.

5 A. No, I have nothing to add.

6 MR. FREIDIN: Those are my questions, Mr.
7 Chairman.

8 THE CHAIRMAN: Very well. Thank you, Dr.
9 Allin.

10 I guess we can adjourn for the day,
11 ladies and gentlemen, and we will start tomorrow at
12 9:00 a.m.

13 Thank you.

14 ---Whereupon the hearing adjourned at 5:55 p.m., to be
15 reconvened on Tuesday, March 7th, 1989, commencing
at 9:00 a.m.

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